ROBERT S. PEABODY FOUNDATION
FOR ARCHAEOLOGY

FIRST ANNUAL REPORT OF THE AYACUCHO ARCHAEOLOGICAL-BOTANICAL PROJECT

BY

RICHARD STOCKTON MACNEISH

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AYACUCHO ARCHAEOLOGICAL-BOTANICAL PROJECT, REPORTS

Number One

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INTRODUCTION

During the last ten years the R. S. Peabody Foundation for Archaeology has been much concerned with the problem of the origin of agriculture and the relationship of this phenomenon to development of village life and ultimately to civilization in New World centers. The first endeavors to attack this problem were undertaken in the Tehuacan Valley of Mexico (Byers 1967, MacNeish 1964). Here a series of excavations and interdisciplinary studies gave us much information concerning the origins of agriculture at least in the highland area of Mexico, in the Tehuacan Valley, and some data about the origins of Mesoamerican civilization. In other words the basic cultural change from hunters and gatherers of 10,000 B.C. and their gradual development to civilized city-dwellers is characterized by a very stable subsistence such as existed at the time of conquest.

The second center in the New World in which other plants and some animals were domesticated and which also saw the development of civilization was Peru (Sauer 1949, Towle 1961). So, even though our answers about the origins of civilization and the whole agriculture picture in Mexico were not completed, we at least had its outlines and felt ready to attack the second New World center, highland Peru. A study of this area we hoped would give us more data concerning the same problem, and these could be used comparatively to test the hypotheses concerning the origins of agriculture and the concomitant development of civilization that were based upon our endeavors in Mexico (MacNeish 1967). In the end we hoped that our two comparative studies would permit making some generalizations about the rise of civilization itself at least in the New World.

Undertaking archaeological investigations in Peru presented a number of difficulties, not the least of which was my lack of first-hand knowledge of the archaeology of the whole region, and, as I found out later, traveling conditions in the Andes. A third difficulty was that the previous archaeology of this key nuclear area, and particularly the archaeology of the crucial preceramic period when agriculture began, was confined largely to the coast. This is not meant as criticism of the archaeologists who have worked in the area, for some excellent investigations had been carried out on the preceramic period of coastal Peru by Patterson and Moseley (Patterson 1966, Patterson and Moseley 1968) following the fine preliminary studies of Lanning (1963, 1965), Vescelius (1969), Bird (1948), Engel (1966), and others. Of particular significance is the sequence of cultivated plants existing on the central coast between 5000 and 1750 B.C. that was established by Moseley, Lanning, and Patterson. As Patterson and Moseley (1968) have indicated, the domesticated plant evidence indicates rather conclusively that the origin of agriculture did not occur on the Peruvian coast. This is in agreement with the recent studies of Pickersgill (Pickersgill 1969) indicating that most Peruvian plants were domesticated in the highlands and some did come originally from domestications in the selva. Although there have been two high quality cave excavations of preceramic sites by Cardich (1964) and Ravines (1965, 1966) in the highlands, they have presented some difficulties, for while there were cultural sequences for this period the sites contained no plant remains whatsoever. Thus, at the time we started to plan our endeavors in Peru, we had a coastal domesticated plant sequence and little or nothing concerning plant origins. There was also a fine archaeological sequence in the highlands having no plants whatsoever. The kind of results we were seeking had never been sought by archaeologists in Peru and there was a general consensus that interdisciplinary studies were not feasible. Part of the resistance to the idea was due to the reluctance of many archaeologists to recognize the possibilities of this approach to the problem of the development of human culture. Another factor was a misconception, that is, a belief that the necessary plant remains and other non-archaeological materials simply did not exist in the highlands. Despite these chronic objections I believed that the area and the problem was of key importance and that in some way early plant remains must be awaiting discovery in the highlands. If found as expected, then an interdisciplinary method of approach such as we had applied in Tehuacan was the best method for the solution of anthropological problems in that area.

Obviously the first step in determining whether such a program of research was feasible in highland Peru was an archaeological reconnaissance of the area and this was carried out with the assistance of Rogger Ravines in 1966. This survey was based on, and in fact the areas considered were limited by, four sets of facts and opinions about the area. First were the conclusions of the botanists, such as Ochoa, Leon (1964), Grobman (Grobman et al. 1961), and Pickersgill (1969) who, because of their genetic and taxonomic studies, believed that many of the plants originated in the highlands. Without going into detail, their opinions were that most plants of the highlands had been domesticated between Bolivia and Ecuador in elevations between 3,000 and 10,000 feet. Thus, the good solid botanical evidence delimited the area we were to look in. Second was the archaeological evidence. On the assumption that the first village life in the highlands was based on agriculture, it was necessary to work in areas where there was evidence of early cultural complexes and village life. This meant that we had to look in valleys between Cajamarca on the north (Reichlen and Reichlen 1949) and Lake Titicaca on the Bolivian border on the south (Kidder 1943). The third governing factor was that we had to locate caves in which plant remains could be found. We again had a very definite limiting factor: we had to find valleys with caves containing early cultural remains in the area where the botanically important plant complexes occurred. The final factor was based on an assumption which had been established in our Mexican work, that is, that the most likely places for plant domestication were ones that had a wide variety of ecological niches in a relatively limited zone which was geographically interrelated and interconnected. This fourth factor had to take into consideration the ecology of the highland areas. We are most fortunate that an extremely good preliminary ecological study had been undertaken in Peru by Tosi (1966). From a study of his conclusions it seemed readily apparent that the highland valleys most likely to have given rise to agriculture were those in which there was great variability ranging from desert climate through various kinds of spiny forest to wet forest to tundra. Therefore, we now had four sets of factors and each governed where we looked. I may add that when we began our survey we literally used Tosi's maps and book as a handbook often instead of the local road maps distributed by the tourist bureau.

Our survey began in June 1966 and first took us from Lima up in the highlands to the Tarma and Huanuco valleys (Fig. 1) that seemed to have most of the desired conditions. While they met most of the conditions, these two valleys lacked one very important factor. In neither one could Ravines nor I find good dry caves having stratified preserved remains. Therefore, these valleys were eliminated. The next area we looked at was around Huancayo, the Mantaro Valley, the Rio Pampas Valley, and the environs of Ayacucho. The first three of these areas had neither the ecological diversity nor the dry caves we sought, but Ayacucho did. This area seemed in our initial survey to have considerable possibilities and we were to look at it again. A third area, still further south which I did not personally examine although Professor Nelken and Ravines did, was around Arequipa and Tacna. Here again the ecological diversity was not very great nor were there dry caves with stratified preserved remains. Our next trip took us farther north. There was first a quick trip into the Chavin Valley, and then into the Maranon Valley. Both areas lacked the ecological diversity and dry caves we were looking for. Next we moved farther north and examined the Huancabamba area which turned out to be far too wet and had little ecological diversity. We then moved a little farther east to Bagua and another part of the Maranon Valley. We found caves but there was little ecological diversity and poor preservation in the desert area. We finally made a brief traverse from Cajamarca east to the Rio Maranon. The area lacked caves and ecological diversity in addition to being too wet. After this northern survey between the

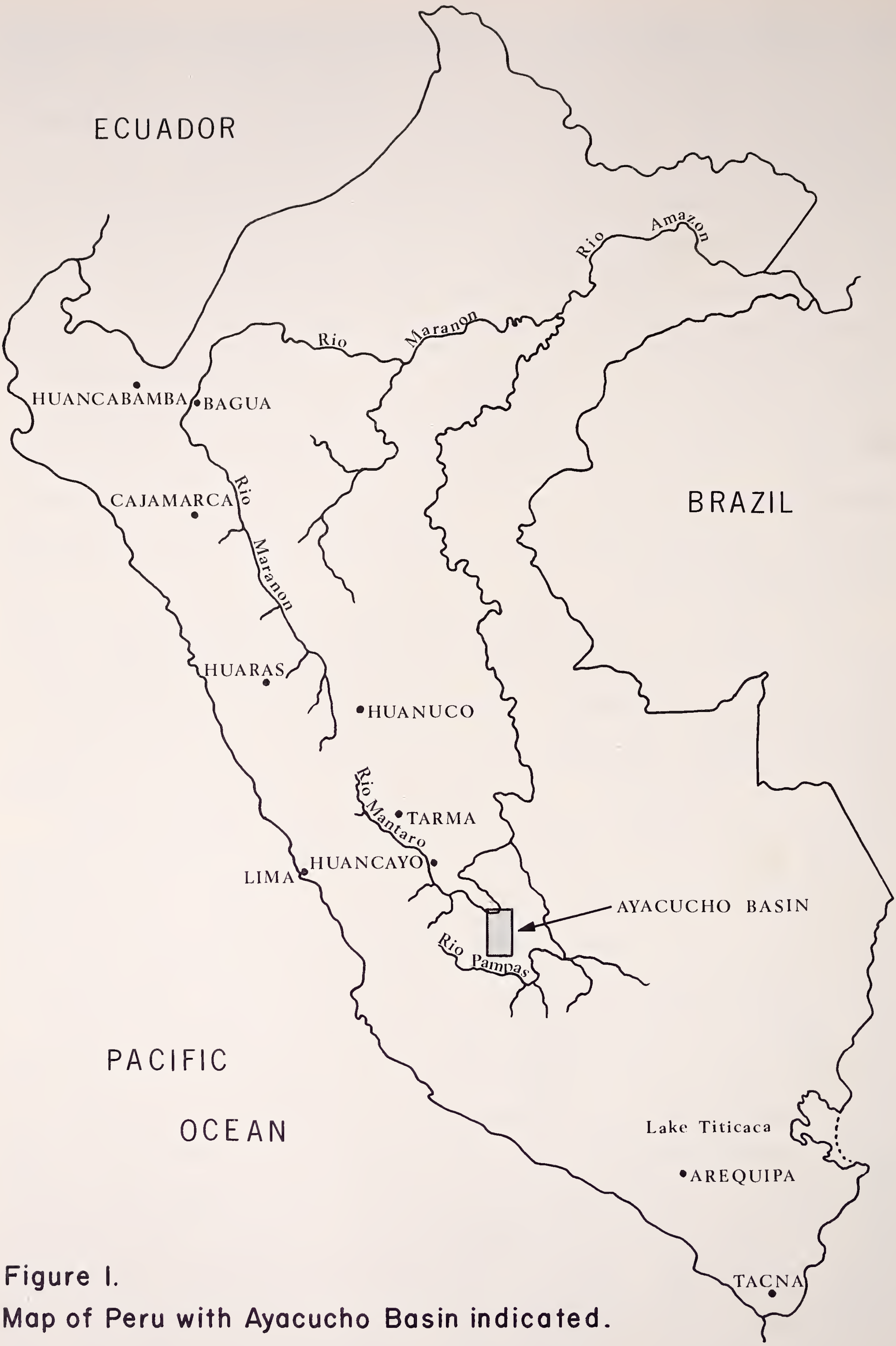


Figure I.
Map of Peru with Ayacucho Basin indicated.

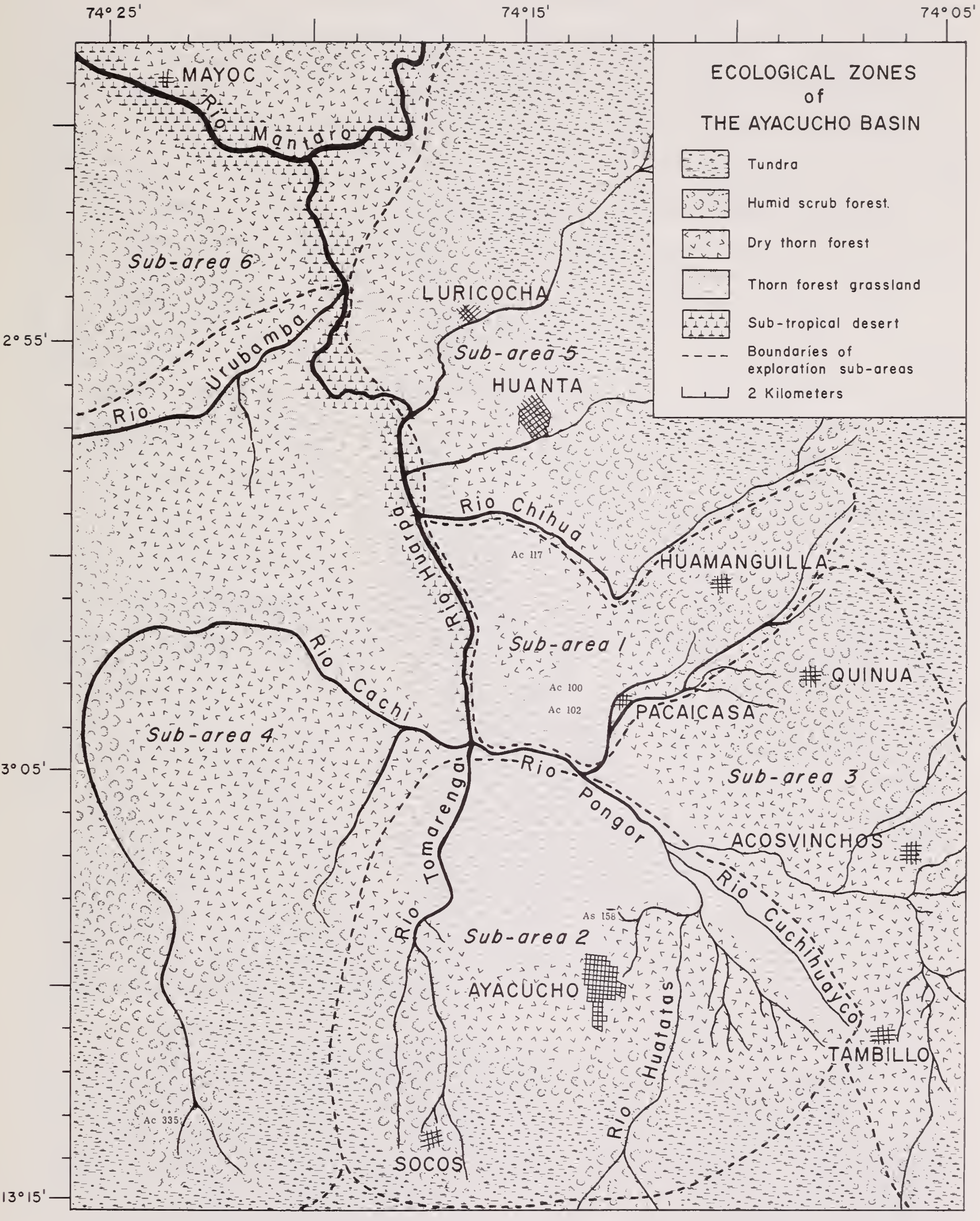


Figure 2. Ecological Zones and Sites of the Ayacucho Basin.

Bolivian and the Ecuadorian borders, only one area seemed to have good possibilities, that is, the Ayacucho area. So I returned to this area, talked to Dr. Lumbreras, the local archaeologist who knew it extremely well, looked again for caves and reexamined the ecological and other possibilities. During this trip, we thoroughly examined a large cave called Pikimachay that obviously had early plant remains. Lumbreras convinced me that there were villages in the area, and a couple of quick trips by car indicated that we had at least five or six of Tosi's environmental niches ranging from desert to tundra within the small basin-like region. (Fig. 2) This is where we decided to work.

The Ayacucho Valley is a large triangular basin about seventy miles on a side bounded by rather high mountains on three sides. On the north it is bound by the Mantaro River which has high mountains north of it. In the southwest it is bound by the upper reaches of the Cachi River which flows down into the basin from the sierras of the province of Huancavalejica. The southwesternmost part of the region is roughly at Tambillo and the mountains near Cangillo just to the south of this town. Thus we had a triangular basin which was bounded on all three sides by mountains over 14,000 feet high producing a rain shadow for the area. Consequently, there was considerable vegetational and ecological diversity in the basin. The high hills below the mountains surrounding the basin were covered with tundra and alpine pluvial types of vegetation. Below these, there was wet forest zone on the flanks of the hills. At slightly lower elevations having even less rainfall one finds spiny forest steppes and then the valley bottom, at the lowest elevations at 6,000 or 7,000 feet, near Huanta supported by a thorny forest zone. It can be seen that within the very small distance of less than seventy miles were five very different environments that were easily explored from a central base. Climatically most of the region is a desert area with a definite rainy season and a wet season. Most of the valley is over 6,500 feet and only the borders rise to 14,500 feet. The climate is mild with greater daily variations in temperatures than annual average variations.

This was also an area in which some good preliminary archaeological work had been done at least on the ceramic horizons. Tello had dug in this area and made his usual good initial survey in the early thirties (Tello 1940). In the early forties Bennett had established some pottery types and done some excellent preliminary work in the site of Wari (Bennett 1953). Somewhat later, Rowe, Collier, and Willey (1950) did further work at Wari. In the fifties and early sixties a considerable amount of good work had been done by Lumbreras and Menzel on the ceramic sequences (Lumbreras 1960, Menzel 1964). Furthermore, at present, Benevides of the University of Huamanga is carrying on the archaeological work as well as training a number of students. There was another archaeological factor that was important. Surrounding the area some good work had been done on the preceramic. North of the area, at Huanuco there was the excellent stratigraphic excavation in Lauricocha Cave by Cardich (1964) and Matos had carried on investigations on the preceramic in the Huancayo area (Matos 1960). To the south, near Tacna, Ravines had also done excellent stratigraphic work in Toquepala Cave (Ravines 1966). Also, over the mountains to the west on the Pacific coast Vescelius (1969), Engel (1957), and Lanning (Vescelius and Lanning 1963) had done some work near Pisco and Ica. So we had good comparative archaeological evidence surrounding the area as well as some archaeological work on the ceramic periods within the area. It looked like an excellent region to work because of its environment and the initial archaeological work. The question now became how to set up an organization that could exploit the likely valley we had found in reconnaissance.

Before we left Peru in 1966 we began to formulate our plans. Basic to such an endeavor is a team, that is, the personnel. We were to organize it as in Tehuacan into four divisions: 1) administration, 2) field work, 3) laboratory, and 4) specialists. We were most fortunate that in the fall of 1966 Dr. John Murra's Huanuco project was closing. This meant that his very capable administrator and assistant Gordon Haddon would be available for our endeavors. He was our administrator during this first season and did a remarkable job of keeping the accounts of our rapidly diminishing exchequer, renting our headquarters, buying our jeeps and equipment or transporting it from Andover to Peru, as well as the thousands of other details that fall in this domain. It should be added that in Ayacucho he was aided by our general handyman, Alejandro, our cooks, Theodosia and Aurelia, our laundress, Angelica, and our chauffeur-mechanic, Antonio Vasquez.

For our field team, one of our veterans from Tehuacan, Angel Garcia Cook of the Instituto Nacional de Historia and Antropologia of Mexico, was interested in taking charge of field work after he finished his year working for Francois Borde in France. Also available for archaeological field work were Wayne Wiersum, who at the time was an archaeological student at the University of Wisconsin and working for the Huanuco Project, as well as Augusto Cruzatt, then a student in Ayacucho but later a professor at the University of Huancayo. All joined our group in 1969 and we were further assisted by Urve Linnamae, a former graduate student of mine from the University of Calgary, Canada; Dennis Price on loan from the Texas Archaeological Project; and four students of archaeology from the University of Huamanga in Ayacucho: Hernando Carillo, G. Fajardo, Carlos Chahud, and Ulpiano Quispe. During excavations about twenty stalwart campesinos from the town of Pacaicasa worked under them.

Our laboratory, as in Tehuacan, continued under the capable direction of Professor A. Nelken of the National Center of Scientific Research of France. During the 1969 season she had assisting her, Victor Cardenas, Eduarto Pinto, and Sergio Catacora, all graduate students of social anthropology at the University of Huamanga. Also, nominally under her direction was our photographer Simeon Hyde of Andover, Mass.

The other division, the specialists, was the group most readily available. Even before I went to Peru many of the Tehuacan specialists who had studied corn, beans, squash, zoology, amaranth, cotton, irrigation, and other phenomena had expressed interest in working with our proposed project in Peru. In actual fact, because of financial exigencies, none of them worked with us in the 1969 season. The only one to visit us was Dr. Barbara Pickersgill of the University of Reading, England, who had been studying peppers in Peru when I was there in 1966. She began studies of the local botany and ecology as well as the identification of some of the meager plant remains recovered during this season with an eye toward working with us on a botanical program in the future. She also passed on some cucurbit specimens to Dr. T.W. Whitaker of the U.S. Department of Agriculture, Crops Research Division, and some cotton specimens to Dr. Stephens of North Carolina State University. These gentlemen were kind enough to identify them. Also, specimens were sent to Dr. E. Callen of MacDonald College of McGill University who began studies of archaeological coprolites. Isotopes Incorporated and Dr. Rainer Berger of U.C.L.A. began radiocarbon age determinations of some of the samples we sent them. In addition, quite by accident, one of our early paleontological specimens was identified by R. Hoffstetter of the National Center of Scientific Research of France. I would like here to express my appreciation for the endeavors of all these dedicated scientists who during 1969 operated as an efficient team exhibiting a fine esprit de corps.

A second major consideration in carrying out the project was the scheduling of the operations necessary to carry out the investigations. Here, our general plan was and continues to be divided into four stages: 1) the initial stage, that is, reconnaissance with some preliminary excavation, 2) major excavation, supplemental survey and the beginning of specialized studies, 3) major specialized studies and supplemental excavation, and 4) the final coordination of information and writing it up. The 1969 season saw the completion of the first stage.

A third and obvious ingredient in making this project possible was financial. After a number of frustrating delays between 1966 and 1969, the National Science Foundation provided grant no. 2446 to the R. S. Peabody Foundation under the direction of Dr.

Frederick Johnson. I was to be the principal investigator. Furthermore, Dr. Johnson, with the full approval of its Board of Trustees, George Bush, John Monroe, and Stephen Hord, was responsible for the budgeting of the R. S. Peabody Foundation's funds in order to aid in the financing of our Peruvian investigations. I would like to thank not only the above-mentioned individuals, but also the National Science Foundation for making this project possible.

The final step in organizing the project was to secure permission for investigations. First of all I want to thank Francois Cooke, cultural attache of the U.S. Embassy in Lima, for submitting our applications to the correct officials of our host nation, Peru. Here I use the word host in the finest sense of the word, for not only the officials but also everybody Peruvian with whom we were in contact showed us every courtesy and helped out at every turn. First and foremost to be thanked must be Hermann Buse de la Guerra, Presidente del Patronato Nacional de Arqueologia, who not only officially presented to us our archaeological permit on behalf of the Peruvian government to carry on our investigation, but also at the end of our season wrote up the results of our endeavors for Peru's leading newspaper, "El Comercio." He also presented, on our behalf, a summary of our results to the members of the Patronato and to Cesar Miro, Director General de Cultura of the Ministerio de Educacion Publica at their official meeting in September. Although I greatly appreciate the efforts of all the members of the Patronato and the Casa de Cultura, I would especially like to thank Luis Lumbreras and Ramiro Matos, members of the Patronato in whose archaeological zones we worked and who were most interested and helpful. But then again every official was courteous and helpful, whether it was the customs men who allowed us to bring in to Peru an unbelievable amount of strange equipment, the immigration officials who, one morning saw five of our members with passports from four different countries arrive with six different kinds of visas, or the military officials who, during a Peruvian-American political crisis helpfully allowed us to obtain the very important restricted aerial photos of the Ayacucho region. Again, however, I single out for special thanks certain officials directly connected with archaeology. These are Jorge Muelle, Director of the National Museum of Archaeology, and Rogger Ravines, an assistant in archaeology at the same museum. In Ayacucho there was the same kind of excellent relationship. The people of the University of Huamanga from the youngest student to Rector showed us every courtesy, and it is an understatement to say that this was not one of the calmest times in the University's four-hundred-year history. Again, I single out my anthropological colleague, L. Benevides, Chairman of the Department of Anthropology at the University of

Huamanga and his anthropological students for special thanks. The smoothness of our operation in Ayacucho and the success of our survey and excavation in the surrounding country are evidence of the excellent cooperation and hospitality we received, and we are all indeed very grateful.

Perhaps the best introduction to an account of the accomplishments of the 1969 field season is a brief summary of our schedule of activities. Professor "Toni" Nelken, Angel Garcia Cook, and I arrived in Lima about mid-March to obtain the necessary permits, buy equipment including a Nisson jeep and other supplies, and prepare the way for the project. This we accomplished in a week; at the end of the week we were joined by Wayne Wiersum. Then Toni, Angel, and I were off to Ayacucho by Faucett Airways while a pirate-looking Nisson chauffeur drove the jeep, its equipment, and Wayne from Lima over the Andes to Ayacucho on a harrowing trip through floods, landslides, and police check points (with all the wrong official papers). Once there Wayne, Angel, and I began to scout out our territory and do initial survey, and Toni searched for a headquarters and household staff. By the end of the third week we had found a place suitable for a headquarters at 127 Jiron Callao in central Ayacucho, thanks to the advice of Daniel Vallee, Chairman of the Department of Anthropology at the University of Montreal, and his wife Rene who became our friendly neighbors. Here it also seems appropriate to express our gratitude to Gabriel Escudero and his wife Mary who were our friendly and helpful landlords. By the end of the third week, Angel, Wayne, and I had taken a cursory look at the area to be surveyed and knew a little about getting around in it. We had found some sites and had been over the reconnaissance data previously amassed by the University of Huamanga. Thanks to Tosi's work we knew a little about the ecology of the area and so, on the basis of all this information, we made our plans for the intensive survey. At about this time Gordon Haddon arrived to take over the administration and Carlos Chahud and Augusto Cruzatt were hired to assist in the survey. In the first week in April I returned to Andover.

During the rest of April and May, Haddon set up administrative procedures that were coordinated with those of my able assistant, Theodora George, in Andover, and organized the household. Nelken had her laboratory built and equipped, established a cataloging and analysis system, and hired three more staff. The survey, under Angel, now augmented by Hernando Carillo and Willy Fajardo, discovered and collected from over two hundred sites. We had a firm foothold and a well-organized operation going in the Ayacucho region and we were ready for the "big push" in the last half of the season. In June I returned with Urve Linnamae and almost immediately we made arrangements to dig

Pikimachay Cave. This operation continued under her direction until the first week in September. She had as student assistants Augusto Cruzatt and Ulpiano Quispe as well as six local workmen. Dennis Price also arrived in June and joined the survey which now consisted of two three-man teams. Also, Simeon Hyde arrived to set up our darkroom and take over the photography until he left in September. In the meantime, Nelken and I began a preliminary examination and classification of the material found in survey, including the establishment of preceramic complexes by seriating the materials from the first fifteen nonceramic sites found in the reconnaissance. These activities continued until about mid-July when we made some minor changes in the schedule. At this time we continued survey with one team, while Dennis assisted by Chahud and Carillo began the excavation of Ayamachay Cave. Urve and her group continued in Pikimachay and Toni and I began analyzing excavated materials from that cave as well as helping Dr. Pickersgill with her initial botanical endeavors. Then, in August, about the time our botanist left, the final survey team began testing a series of promising cave sites. This terminated when they left during the first week in September. Although we plan to close down investigation in October, as I write this report Price is excavating Rosamachay Cave, Chahud is finishing the survey in the Huanta area, Haddon is studying modern ceramic techniques and materials, and the laboratory is finishing up the cataloging and preliminary analysis. Let me add that the above summarized operation ran pretty much as we originally planned it, and the archaeological finds, particularly in late August and early September, were exciting ones.

EXCAVATION

The archaeological reconnaissance was basic to our archaeological research and was the first step in the archaeological investigations in the Ayacucho Valley. Here we were most fortunate, for the University, first under Lumbreras and continuing under Benevides, had already done some archaeological survey in the area and had recorded about eighty sites. Also, they had devised a system for numbering these sites, and after some study of their methods we devised an archaeological survey form which was in agreement with their system. We began our first sites and our first recording of new sites and materials with site As 81.

Preliminary to our actual survey were the trips that Cook, Wiersum, and I took at the end of March and in early April to see what the area was like. On the basis of these preliminary trips covering our area and the surrounding territory we decided the area could be divided for survey into six subareas. These subareas, from many standpoints, were not cultural areas in any sense of the word and only vaguely coincided with the ecological zones. Essentially, these subareas were delimited for convenience in transportation, existence of proper roads, and other factors of logistics.

Subarea 1 was the central hill zone which included the famous Pikimachay Cave. This zone was surrounded on the north by the Chihua River, on the west by the Huarpa River, on the south by the Pongor River, and to the east by the arroyo Matara that cut through Pacaicasa. This subarea was the one which Angel, Wiersum, and Chahud surveyed first, mainly in the month of April. Here, they found about seventy-five sites including a few of the ones I had seen in 1966.

Subarea 2 was the southwest part of the valley in the region near Ayacucho. It extended northward as far as the Pongor River, to the east to about the Cuchihuayco River, to the south to the large high hills in back of Ayacucho, and almost over to the Cachi River to the west. This area was explored mainly in April and May by Cook, Wiersum, Chahud, and Carillo. Here they collected materials and recorded 125 sites. These included a large number already found by the University.

Subarea 3 was the southeast part of the valley which we often referred to as the Tambillo-Quinua subarea. It extended from about the Cuchihuayco River in the southwest to the high mountains to the east and from about the town of Tambillo to the south to Quinua on the north, or, more correctly, to the upper reaches of the Chihua River. This was a huge triangular area explored mainly in June and July. During part of this exploration, though Angel Garcia Cook (with Wiersum and Chahud) was in charge of the survey, a second group which included Price, Carillo, and Fajardo, also explored this area. Within this zone about 160 sites were discovered and recorded and materials were collected from them.

Subarea 4 was the western part of our zone. Basically it was made up of three valleys, the Cachi Valley which entered our region from the southwest, the Huarpa or Cachimayo Valley along the southwestern edge, and the Urubamba Valley that came into the Huarpa Valley from the northwest. Here, Angel, Wiersum, Price, and Chahud did some preliminary exploring in July, but after a very short time it appeared that this subarea was not very dry, and not one of Tosi's ecological dry zones; secondly, the rock in this area was of a unconsolidated, flaky, volcanic rock, the structure of which formed few, if any, caves. After we had found about five sites in this area, one of which, way up on the Cachi, we dug, we stopped survey and wrote this area off as one which would not contribute to our research objectives.

Subareas 5 and 6 in the north end of the valley, roughly from the Chihua River to the Mantaro River, were also looked at briefly in July and, at that time, it was decided that perhaps for the immediate future it was more important to test some of the sites that had been found in subareas 1 to 4 rather than carry on an intensive survey in subareas 5 and 6. These latter subareas, though dry and ecologically promising, definitely had types of rock that did not produce caves. However, at the end of our major field season, that is, during late September and early October, Carlos Chahud who had already done some survey in these subareas, was given the task of intensively surveying the region in order to complete our knowledge of the kinds of materials in our whole area. At the time of the writing of this report, and based on the present rate at which he is finding sites, he will probably find about 130 sites in this subarea.

After subareas 4, 5, and 6 looked so discouraging, we looked again at Tosi's maps of ecological zones for a good dry one at low elevations like the Huarpa and Mantaro Rivers in subareas 4 and 6 and it became immediately apparent that just south of the Ayacucho basin and not very far south at that was a large area along the flanks of the Pampas River that might have dry caves, very dry desert conditions, and that also was at an elevation of about 2,000 meters. On the basis of this, Cook, Wiersum, Cardenez, and I made a three-day trip to the Pampas River valley to see whether it had possibilities. We did find one dry cave although there were no artifacts in its stratified levels of preserved vegetable materials. The subarea does look promising. However, we had neither permission, time, nor money to explore this region during the first season. It is hoped that eventually we can work in this subarea more intensively.

All things being considered, it has been a most encouraging preliminary reconnaissance. When I left Peru in September we had, at that time, recorded 360 sites and the laboratory had already catalogued about 26,000 lithic artifacts from 250 of these sites, as well as 18,000 sherds. I will guess that at the close of the 1969 season we will have found about 500 archaeological sites in the Ayacucho basin and about 70,000 artifacts.

While the purpose of the reconnaissance was to discover stratified sites for excavation, it also can give us data for a study of changing populations and settlement patterns, and the implied social changes that have taken place in the prehistory of the valley. Even the raw data, excluding excavated components, based upon preliminary analysis of only 207 sites listed below, are of interest for they give a very different population picture from the one that is usually presented for highland Peru. I shall present this survey material in terms of our archaeological complexes or periods which we shall consider in more detail later in this report. The list is as follows:

1. Puente complex, 8000 to 6300 B.C. - 1 site found.

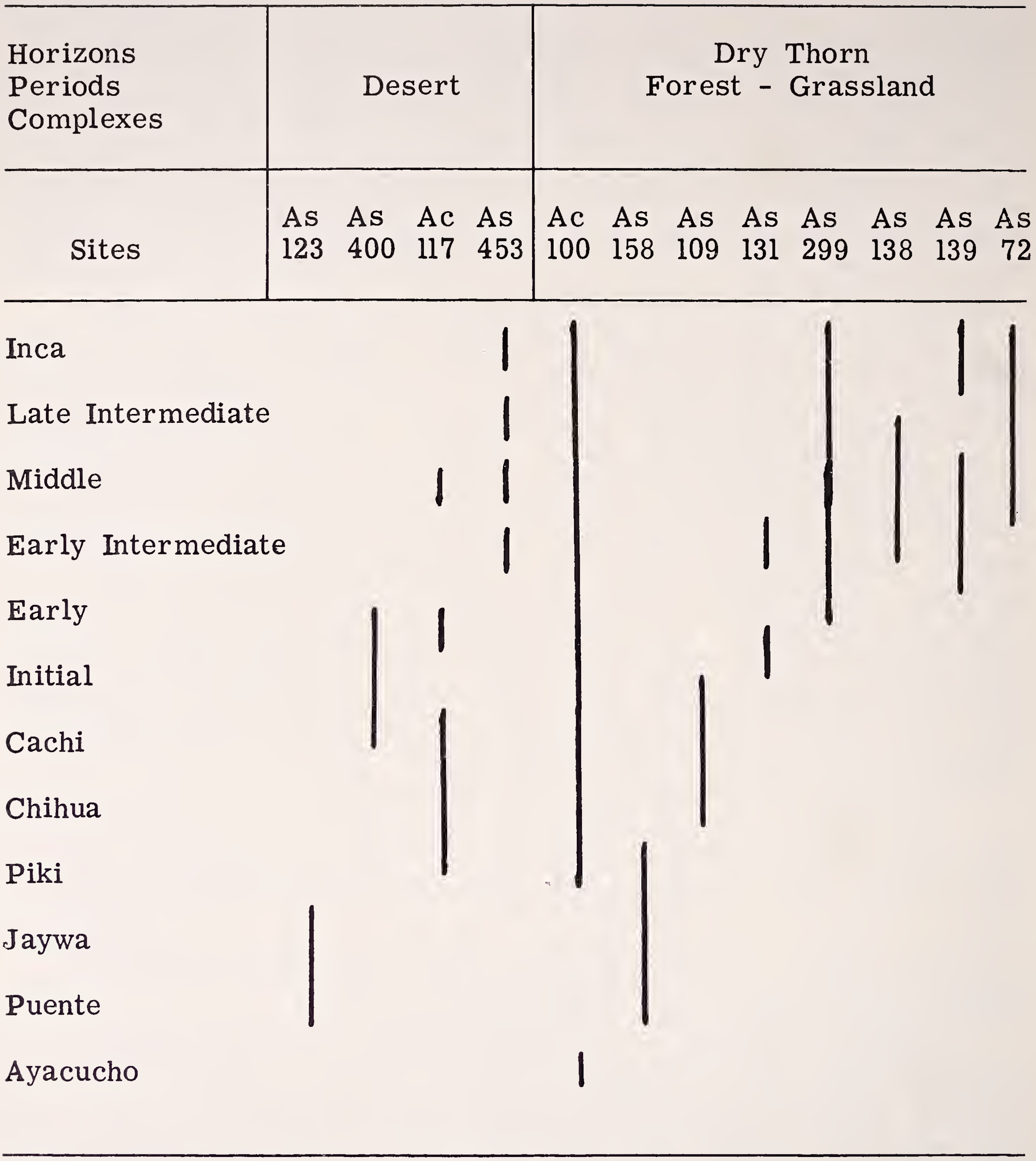
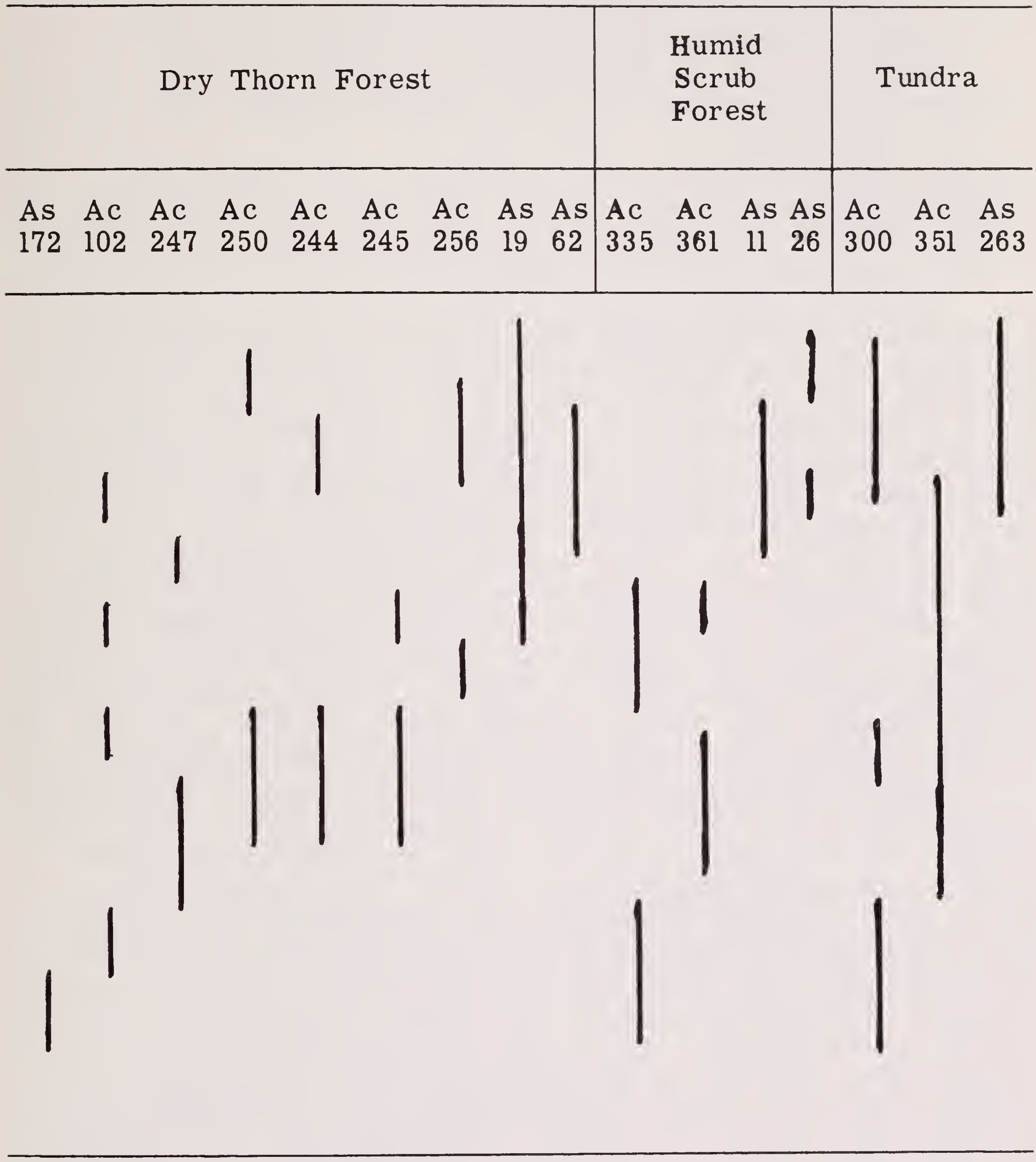


Fig. 3. Distribution of stratified sites by time periods and ecological zones.



Dry Thorn Forest
Humid Scrub Forest
Tundra
As 172
Ac 102
Ac 247
Ac 250
Ac 244
Ac 245
Ac 256
As 19
As 62
Ac 335
Ac 361
As 11
As 26
Ac 300
Ac 351
As 263

2. Jaywa complex, 6300 to 5000 B.C. - 3 sites found.
3. Piki complex, 5000 to 3800 B.C. - 0 sites found.
4. Chihua complex, 3800 to 2700 B.C. - 10 sites found.
5. Cachi complex, 2700 to 1700 B.C. - 18 sites found.
6. Initial Period, 1700 to 900 B.C. - 23 sites found.
7. Early Horizon, 900 to 100 B.C. - 32 sites found.
8. Early Intermediate Period, 100 B.C. to A.D. 500 - 89 sites found.
9. Middle Horizon, 500 to 1000 A.D. - 22 sites found.
10. Late Intermediate Period, 1000 to 1400 A.D. - 7 sites found.
11. Late Horizon, 1474 to the Spanish conquest - 3 sites found.

However, for the purpose of building an initial chronology and much more important than the single period sites, are about forty sites that have evidence from either surface collections or from preliminary testing of stratigraphy. Some of the more important sites with stratified deposits are in the appended chart (see Figure 3) and I shall say a few words about some of them in the following brief summary: 1) Pikimachay Cave, Ac 100. This cave has the very early Ayacucho complex dating perhaps about 12,200 B.C. ± 180 followed by deposits with all the periods from Piki, 5000 B.C. to Inca, 1530 A.D. 2) Jaywamachay Cave, Ac 335. Here we have Puente and Jaywa materials, that is, materials from roughly 8000 to 5000 B.C., under Initial Period sherds of about 1500 B.C. 3) Tambo Cave, Ac 300. Here, testing revealed Puente and Jaywa materials from 8000 to 5000 B.C. under Cachi remains at about 2000 B.C. which are in turn under Early Intermediate materials dating roughly to the time of Christ. 4) Puente site, As 158. This was extensively tested, and we will speak further about it in the following paragraphs. Here, there is deep stratigraphy, over two meters of it, and in our preliminary testings we found Puente materials under Jaywa materials under Piki materials. In other words, here we have remains that run from 8000 to 3800 B.C. 5) Ayamachay Caves, Ac 101 and 102. Both were tested and both of them revealed Jaywa materials dating roughly to 6000 B.C. under Early Horizon materials dating roughly to 500 B.C., and Middle Horizon sherds dating somewhere around 1000 A.D. 6) Cave sites Ac 117, Ac 351, and Ac 119 all have Piki materials, that is, 5000 to 3800 B.C., under some sort of late preceramic materials dating around 2000 B.C. under Early Horizon and Early Intermediate Period sherds that date between roughly 800 B.C. and 200 or 300 A.D. 7) Open site As 109 and caves Ac 244, Ac 245, Ac 247 and Ac 250 have late preceramic materials, that is, between 3800 and 1700 B.C. under either Initial Period or later ceramics. 8) There were also sites with Initial Period ceramics, that is, ceramics that might date somewhere between 1700 and 1000 B.C. As 131 had them under Early Horizon and Early Intermediate Period remains, that is materials from 800 B.C. to A.D. 500., while site Ac 256 has these early ceramics under Middle Horizon or Late Intermediate Period remains, that is remains dating somewhere between 600 A.D. and 1200 or 1300 A.D. 9) Both sites As 299 and As 19 seem to have an almost complete ceramic sequence for the valley. In other words, they have early ceramics starting somewhere around 1000 B.C. and layers of ceramics for every period to 1500 A.D. There were also, in this same category, about a dozen sites which I will not list here that have early ceramics under Early Horizon and Early Intermediate Period ceramics; in other words they have sequences that run from 1000 B.C. to A.D. 500. 10) Finally, we have a number of sites, As 138, As 139, As 62, and As 263, and probably a few others that seemed to have Early Intermediate materials, that is, materials somewhere between 300 B.C. and A.D. 100, under Middle Horizon remains from 600 to 1000 A.D., while sites As 72, As 11, and As 26 have Middle Horizon remains, 600 to 1000 A.D., under Late Intermediate Period or Late Horizon remains that date between 1000 and 1534 A.D.

It appears from our rather incomplete analysis and very preliminary testings of sites found in this area that we have discovered a large number of stratified sites which, upon excavation, will give a very complete sequence, not only for the whole region but for each ecological zone within this region (see Figure 3). These sequences will of course be even better when radiocarbon determinations can be taken from the various stratified layers. This will of course be done in the future when these sites are excavated.

All we have now for the basis of our tentative sequence is a series of artifact complexes from five stratified sites, Ac 100, Ac 335, Ac 102, Ac 117, and As 158. These we tested, and I may add that they were dug specifically with an eye to understanding the preceramic complexes. However, they did in many cases have stratified ceramic remains above the preceramic remains, so we got a little more than we bargained for. Since the stratigraphy in these five sites is the basis for any tentative conclusions we can make about the archaeological sequence of the area, let me say a brief word about each of these preliminary five excavations.

Our most important excavation was in Pikimachay Cave (Ac 100) which I had found in 1966. Excavation of it started in early June and terminated in early September, and was under the capable direction of Urve Linnamae, a doctoral candidate at the University of Calgary. She was assisted by Ulpiano Quispe, Augusto Cruzatt, and the six to eight workmen from Pacaicasa.

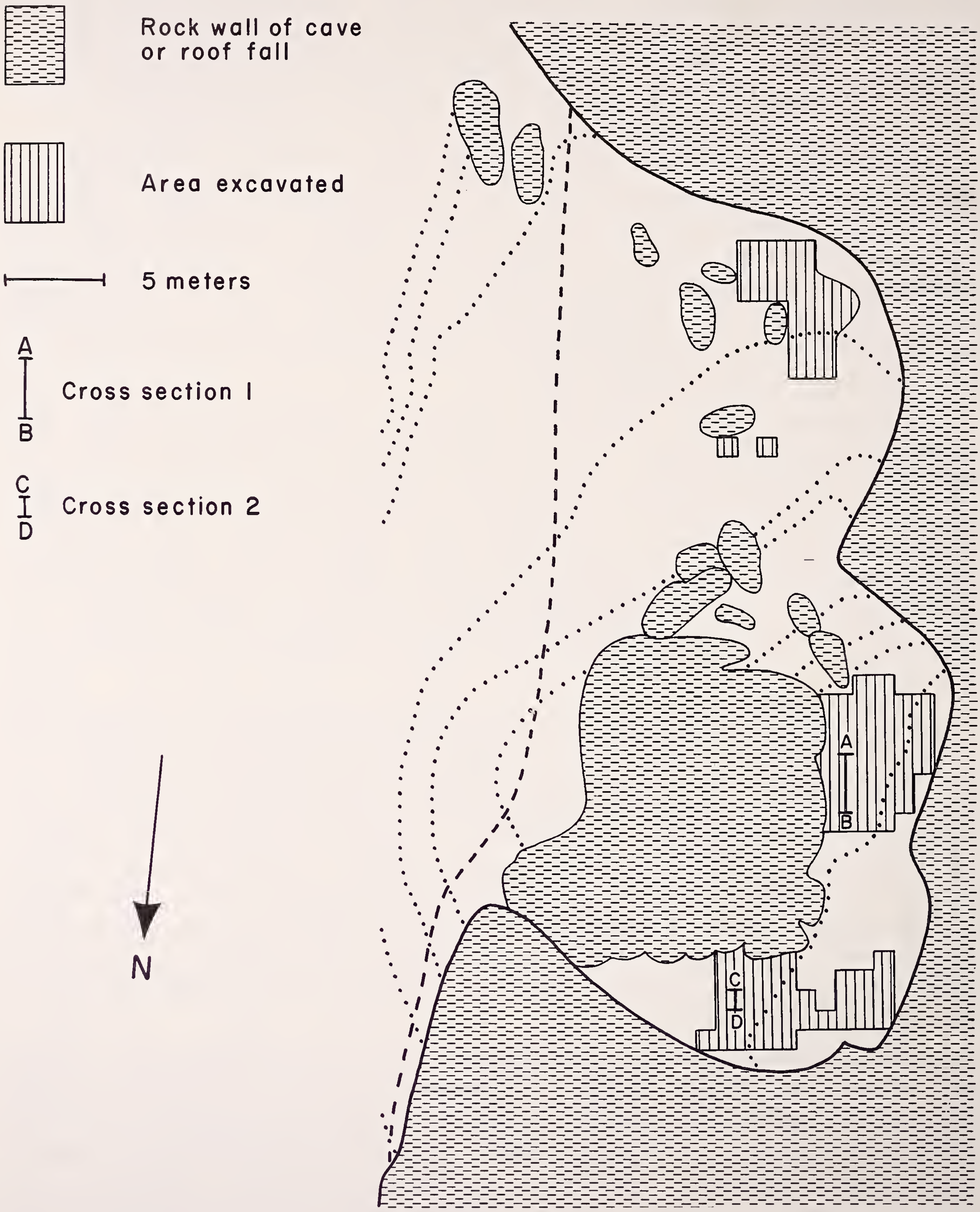
Figure 4.

Pikimachay Cave-Ac100 Floor Plan

Key

- - - - Edge of overhang

· · · · · · · · · 1 meter contour interval



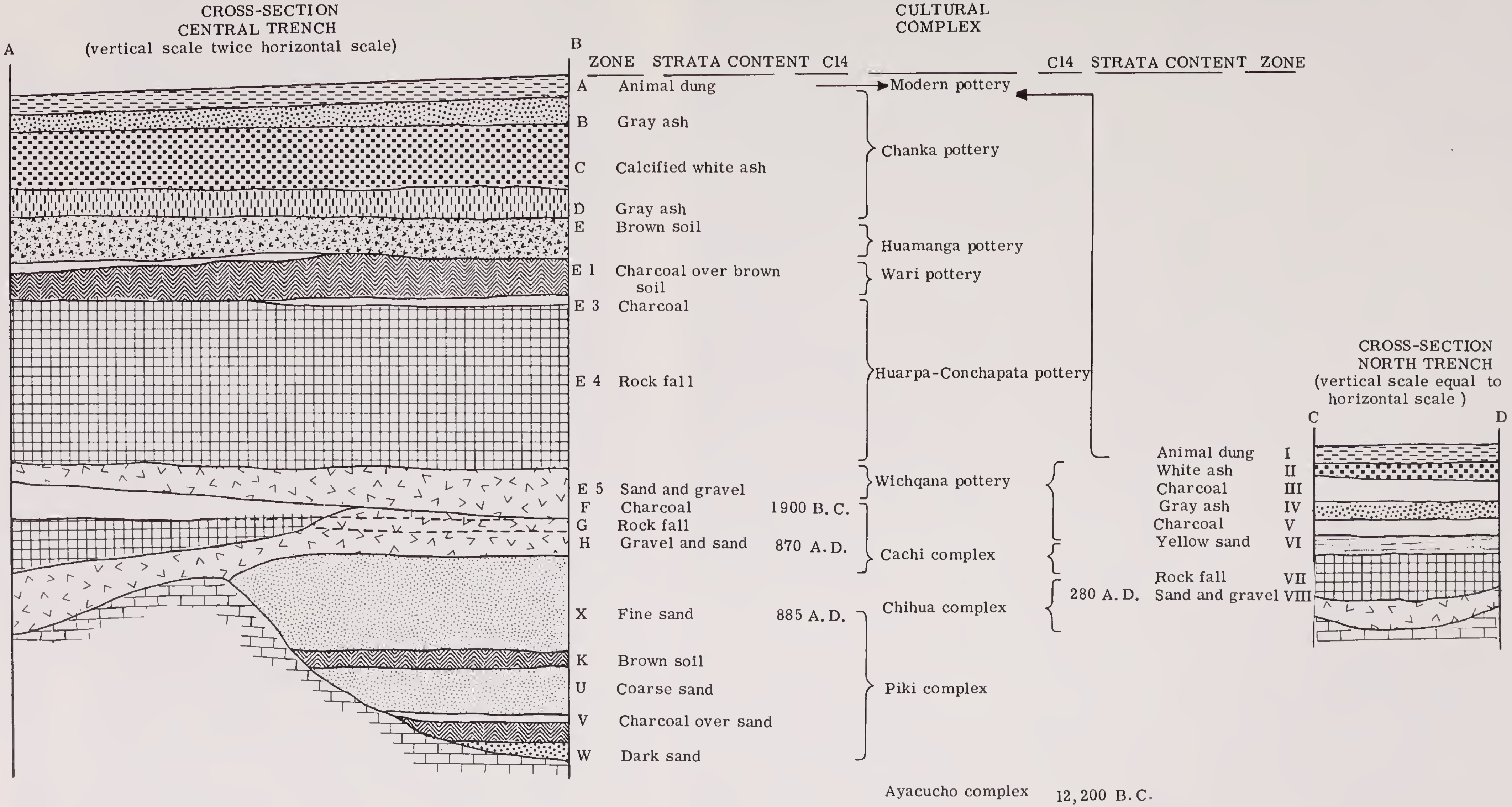


Fig. 5 Cultural correlation of stratigraphy of trenches of Pikimachay (Ac 100)

The cave itself is on the land of Max Morales who was most generous in giving us permission to dig in it and allowing us to build a winding jeep road across his land from the Ayacucho-Huanta highway near kilometer 24 to the terraces just below the mouth of the cave.

The cave itself is huge, being more than 55 meters wide, reaches a maximum depth of 25 meters, and has a maximum height of about 10 meters. It is about a third of the way up the slopes of the hills west of Pacaicasa at an elevation above sea level of about 2900 meters. It faces east-southeast and has a superb view of the Huari ruins across the valley and of the whole south end of the Ayacucho basin.

The floor of the cave is varied, the south end being at the lowest elevation, relatively level and rock free (none weigh over two tons). The outer section of the central and northern parts of the cave are covered by huge rocks that have fallen from the roof. The tops of some of these rocks are more than 8 meters above the level floor of the south room. In back of the large rocks in the interior central part of the cave was a level floor about 5 to 6 meters above that of the south room. This inner central room was about 18 meters long and 3 to 5 meters wide and bordered against both the inner wall of the cave and the huge rocks in the outer central section. This floor ran northward and then made a right angle at the north end of the cave to form a north interior room about 15 meters long and 2 to 4 meters wide. I mention this complicated floor situation for the simple reason that it determined our digging techniques as well as being responsible for the very complex situations that exist below all parts of all present surfaces or present floors.

In digging this cave, we started in the south end of the interior central room where there was a large looter's hole. Thanks to the looter's hole we were able to strip strata from a vertical profile. Usually this profile was about 4 to 5 meters long, and we drove it northward 7 meters, thus completing a small area of about 4 by 7 meters. Within this area the depth of refuse varies considerably, for the rock floor of the cave was uneven and had a series of depressions in it. From top to bottom the stratigraphy was roughly as follows: covering the whole of this surface was Zone A, about 5 to 10 cm. thick, of modern goat and llama dung and other refuse. Below it was Zone B, a gray ash layer. This zone had Chanka pottery in it as well as considerable remains of foodstuffs. Zone C below it, a white ash layer, and Zone D below Zone C, still another ash layer, contained about the same kind of materials. Zone E was slightly more complicated and was subdivided into a number of subzones. The top was Zone E, a brownish disintegrated layer of vegetable remains, where there was a quantity of plant remains and also

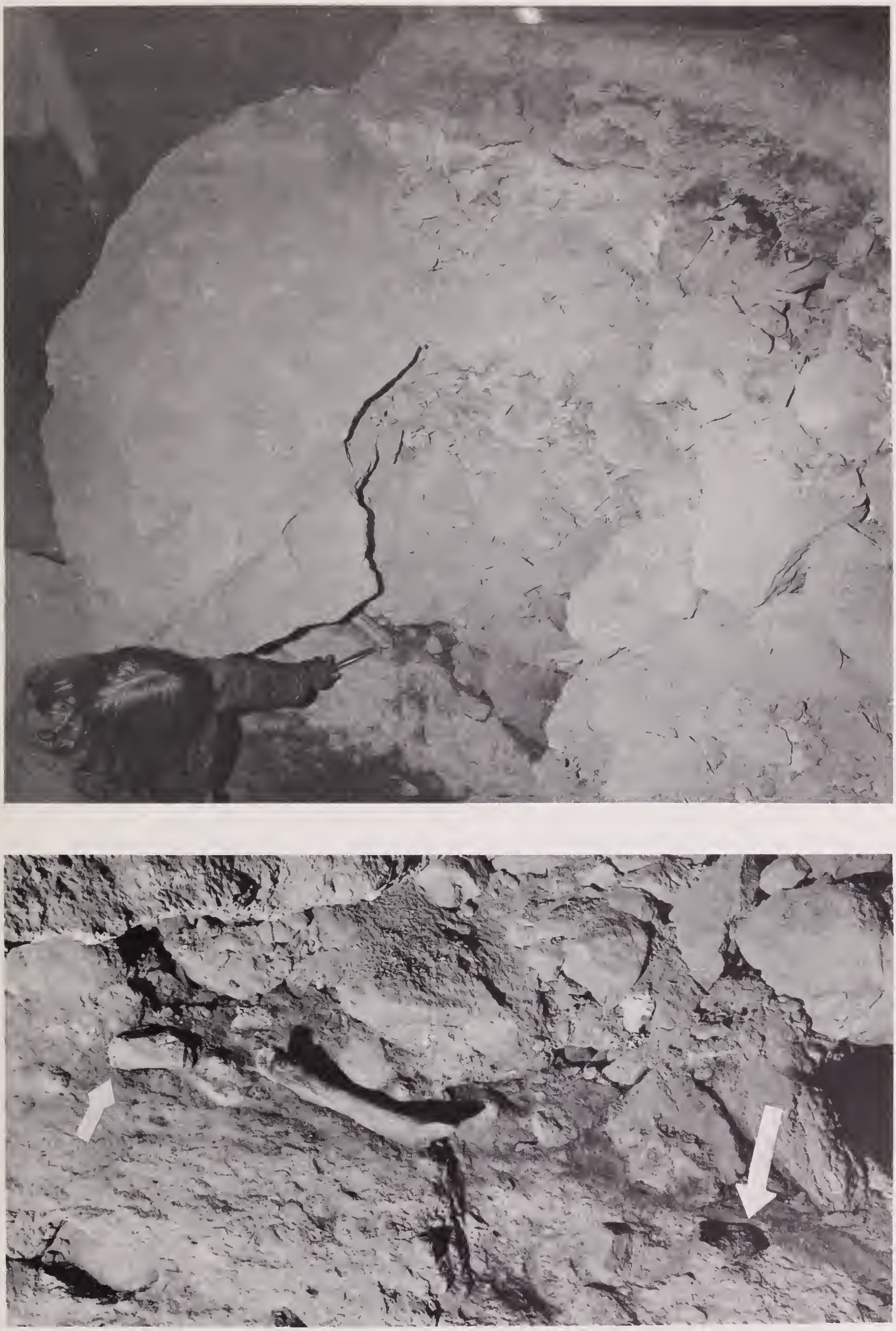


Fig. 6. (Upper photo) Urve Linnamae pointing at sloth rib with artifacts in situ; (lower photo) sloth rib with pebble chopper (little arrow) and sidescraper (big arrow). Pikimachay, Ac 100.

pottery of the Huamanga type of the late Middle Horizon. Below it in E1 and E2 were Huari Polychrome sherds dating to the early part of the Middle Horizon. E3 contained both Early Horizon and Early Intermediate Period pottery with a lot of foodstuffs, while E4 and E5 contained Early Horizon or Initial Period ceramics as well as foodstuffs and bones. Below E5 the situation became more complicated. In the southern part of this trench in a depression there was a floor of charcoal, Zone F, dated by radiocarbon at 1900 B.C. ± 120 (I4154), which seemed to be late preceramic Cachi culture; Zone G, a layer of rock fall underneath it with similar remains; and then a yellow sand layer, Zone H, underneath Zone G which probably had early Cachi remains in it as well as a few plant remains including squash and gourds, also some bones. There were a few small sticks that must have been intrusive for they were dated by radiocarbon at 870 A.D. ± 95 (I4498). This date is obviously out of order. To the north there was another depression and the actual connection between the stratigraphy of the first depression and the second depression is not too clear. However, it does seem that Zone H overlies the materials in the stratigraphy of the northernmost section. Seemingly, under Zone H of the southern depression are Zones X, K, U, V, and W. These are alternating layers of charcoal and yellowish sand and gravel. Within these various zones, K, V, and W are actual floors and quite a number of artifacts were found, also some squash, some quinoa, some amaranth, some gourd and maybe chili pepper remains, as well as bone remains. The artifacts from all these floors seemed to be of the Piki complex, even though a stick from Zone X was radiocarbon dated at 885 A.D. ± 95 (I4499). Thus, in this inner central room excavation we had a long and complicated sequence of cultural remains.

Shortly after we started excavating this area we decided we would also put a 4-meter long, 1-meter wide trench in the north room. Again, we were able to start it by our technique of stripping from a vertical face of a looter's hole. Superficially, it looked very much like the central inner room for it had a series of ash lenses over rock fall over a yellowish sand and gravelish soil. However, analysis revealed that the resemblance ended with the color of the soils. Since we never physically connected the levels in the central room with those of this north trench, which eventually became 7 meters long and 2 to 4 meters wide, we numbered the zones and the strata in an entirely different manner: Zone 1 in this area was modern goat dung and ash. Zones 2, 3, 4, and 5 were either floors or lenses of ash, one superimposed upon the other. All the pottery seems to be of the Early Horizon or Initial Period. Zone 6 is a charcoal floor which seems to have preceramic remains. Analysis reveals that these remains are more similar to Zone H and might be either late Chihua or early

Cachi. However, Zones 7 and 8 are something definitely different; these we consider to be definitely of the Chihua culture, even though a large stick from Zone 8 was dated at 280 A.D. ± 95 (I4497). Thus, between these two trenches we have a number of occupations representing a long time period. Since we had neither time nor money to remove the large rocks of the outer central and outer north sections of the cave, we decided to see if we could find out what was underneath the rocks by digging in the south end of the cave. Here we found that underlying the modern dung and garbage of zone a were a series of ash levels, b, c, d, e, and f. These ash levels, which all contained some Early Horizon pottery, all showed some evidence of intrusions due to rats' nests and various kinds of excavated pits. Occasionally, after getting a nice group of Early Horizon pottery from one of these layers we would turn up with a modern peach pit. Below these ash layers was a layer varying from 1 to 2 meters thick of huge rock fall, zone g. Within this layer were all sorts of archaeological material all mixed up--preceramic projectile points, modern pottery, a great deal of Early pottery, and a large number of heavy lithics. Then down below this layer was a well consolidated yellow clayey layer, zone h. This contained Megatheriidae bones and bones of other extinct animals and very definite new types of preceramic artifacts (34) which we call the Ayacucho complex. A fragment of a humerus of a Megatheriidae was radiocarbon dated at 12,200 B.C. ± 180 (UCLA 1464). Below zone h, which was only 2 or 3 inches thick, was a loose, yellow, loess-like, windblown dust 2 to 6 inches thick having seventeen artifacts in it, and fewer extinct animal bones. Although the sample is small the seventeen artifacts seemed to indicate it was another component of the Ayacucho complex. In a few spots below this layer was a hard yellow layer of about an inch thick. It contained more giant sloth bones, some paleollama bones, at least one artifact, and four or five chips. I would guess that this also belongs to the Ayacucho complex. It will be seen that in Pikimachay Cave we had a long cultural sequence consisting of Ayacucho at the bottom; then, with a considerable gap, Piki materials; then Chihua materials; Cachi; Early ceramic remains; Early Intermediate; Middle remains; Late Intermediate; and modern dung. Most of the artifact sequence was supplemented with some foodstuffs, both in terms of dried vegetable materials and bone material. The latter, for the most part, is yet to be studied. It also must be mentioned that as of now this is really preliminary testing, even though we worked three months in this cave, for we have dug less than one-fifth of the total available area, and I suspect that the really good remains of the Ayacucho complex with giant sloth, giant camel, and other fossil bones are yet to be found. We also may eventually find more of the middle part of the sequence and better foodstuffs.

Therefore, "the best is yet to come" from Pikimachay.

Our second excavation, which had a long cultural sequence in it, was an open site, called Puente, As 158. This was tested during only a five-day period by Angel Garcia Cook. He was assisted by his wife, Luce, Wiersum, Pinto, and Carillo. This site is now on the steep slopes of the side of a hill above a water hole on the Wichqana ranch about four kilometers north of Ayacucho. This slope evidently is the eroded remnant of a terrace that originally had been a cave deposit but now is exposed by collapse and erosion of the roof. We dug a 9-meter long, 1-meter wide trench that reached a maximum depth of 2 meters. In this digging we found in the trench in the north end under a layer of rock which used to be the roof of the rock shelter, thirteen different strata going to a depth of 2 meters. The top strata, or Zone 1, was the white rock fall of the former cave roof. Zone 2 was represented by a very nice charcoal floor which was radiocarbon dated at 4410 B.C. ± 110 (I4502). Three was loess with artifacts. Four was more loess with artifacts. Five was a gray zone capped by ash of an ancient floor. Six was another gray zone with some ash in it, and Zone 7 was mainly charcoal. Zone 8 was a brown zone and Zone 9 was a dark grayish-brown soil. All these strata which were about a meter and a half thick in total contained Piki artifact material and some bone remains, including both guinea pig and llama. Underneath this was a yellow zone of soil, Zone 10; Zone 11 which was a thick charcoal floor; and Zone 12, which was another brown loess area with artifacts. These also contained small animal bones and llama bones and artifacts of what we consider to be the Jaywa complex. Underneath this, right above the rock floor of the slopes, was another charcoal floor with a very few artifacts. However, these few artifacts are quite distinctive and seem to be of the Puente complex. From this site we begin to fill the gap in the early part of the sequence between the Ayacucho complex and the Piki complex which we had found in Pikimachay Cave. Now we had a sequence in the preceramic that ran from Ayacucho materials from Ac 100, a gap, Puente materials and Jaywa materials from As 158, and then Piki materials in both the cave and the open site. And then from Pikimachay Cave we had preceramic materials of the Chihua complex which were followed by preceramic materials of the Cachi complex, plus the ceramics column from the top of Piki. Thus we had the beginning of a sequence based on good stratigraphy. It might be added that the Puente site itself, the open site, is a huge site consisting of an area about 9 meters long by 15 meters wide and 2 meters deep all of which has this beautiful stratigraphy. It is crying to be dug.

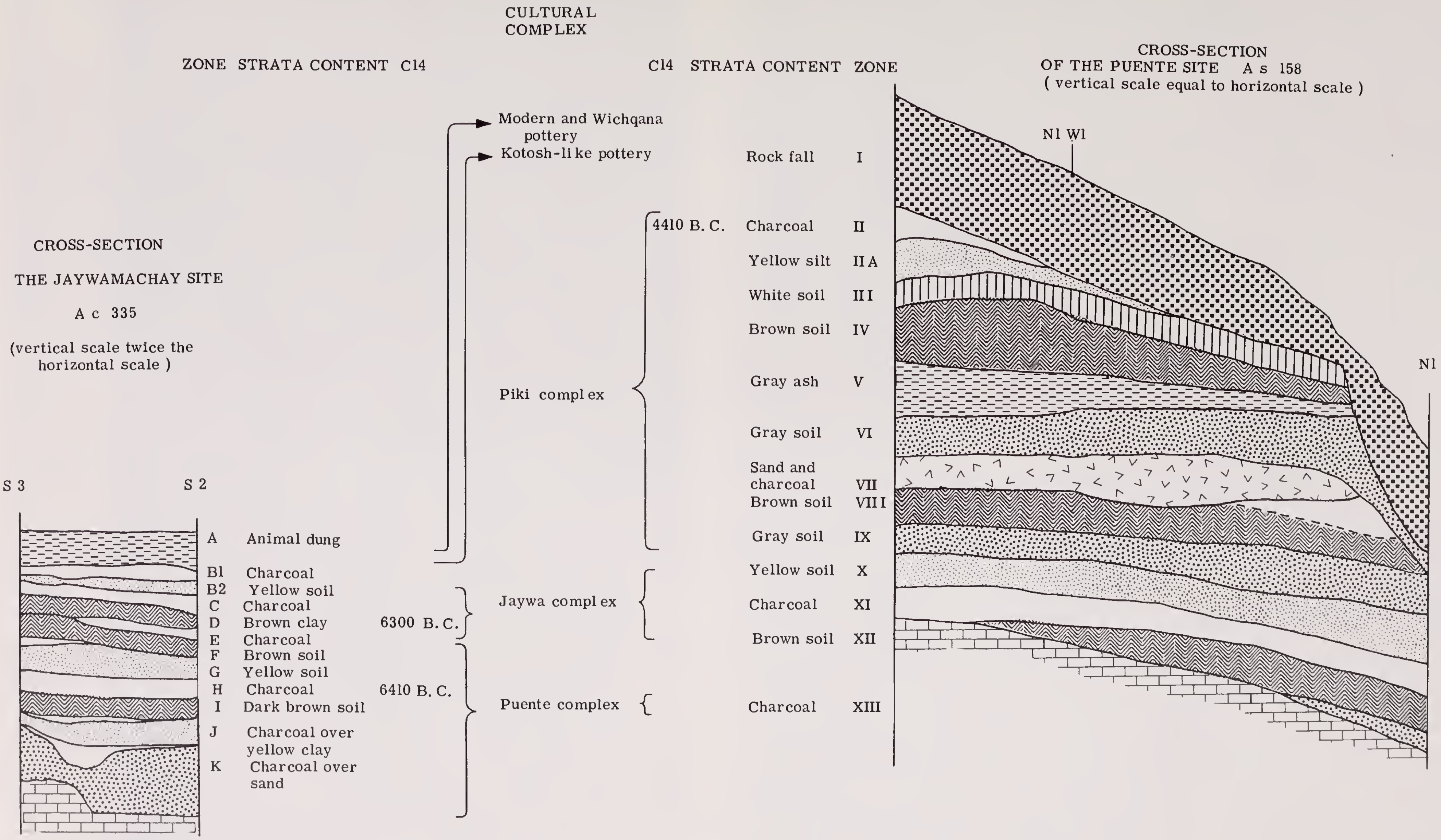


Fig. 7 Cultural correlation of stratigraphy of trenches of Jaywamachay and the Puente site

Another cave excavated by Angel Garcia Cook with the same crew he had at the Puente site was Jaywamachay Cave, Ac 335. This was located southwest of Ayacucho at about kilometer 44 on the Ayacucho-Pisco highway, on the banks of the Cachi River. It also was at an elevation of 3,400 meters above sea level in the Humid Scrub Forest zone, different from the zones of either Pikimachay or the Puente site in the Humid Forest zone. The cave itself is a long narrow rock shelter about 25 meters long and 5 or 6 meters deep. Our test was extremely limited, being only a trench 3 meters long, 1 meter wide, and a little over a meter deep, but it was unbelievably productive. Zone A, the goat dung, had modern remains in it, but surprisingly enough, in the lower part of it, there was Wichqana type pottery of the Early Horizon. Below this was a definite floor called Zone B1 which had Kotosh-like sherds in it and a number of artifacts. Zones B2, C, D, and E were incredibly rich. These were charcoal floors with refuse under each one of them, and some of it from Zone D was radiocarbon dated at 6300 B.C. ± 135 (I4503). All of these yielded a large amount of Jaywa-type material like Zones 10-12 of As 158. Zones F, G, H, I, J, and K were other floors below this. These gave us Puente materials like in Zone 13 of the Puente site, and charcoal from Zone H was radiocarbon dated at 6410 B.C. ± 125 (I4501). But here we had a much better sample and also some possibilities of defining better the Puente complex. Thus, this site added Kotosh-like materials to our sequence in the Initial Period and very much confirmed the stratigraphy of the lower levels of Puente. Also in this different ecological zone, a zone not too good for agriculture, there were abundant large animal bones in all these levels. Interestingly enough in Zone B2 were burned feces of llama, as well as llama bones, indicating that even in the Jaywa period llama were living on the same floors with man. Therefore, there is the possibility that llama was domesticated in this period, somewhere between 6300 and 5000 B.C. Also in the Jaywa levels we did find one seed of Achiote, a domesticate which is native in elevations below 2,000 meters. This may be an early domesticate or early import in the Ayacucho region. Also, there are some charred human feces which will give us more data on other foodstuffs and possible domesticates. Surprisingly enough, however, in the very few plant remains we did find in this zone which is now a potato-growing zone, we found no root crops or evidence of potatoes whatsoever. Any future excavation plans for our area will include further investigations in this cave, for it has a large area of refuse and the possibility of even deeper deposits.

The next cave we tested while I was in the field, which will probably be totally excavated before the end of the 1969 season, is Ayamachay, Ac 102. This site is located on the same slopes as

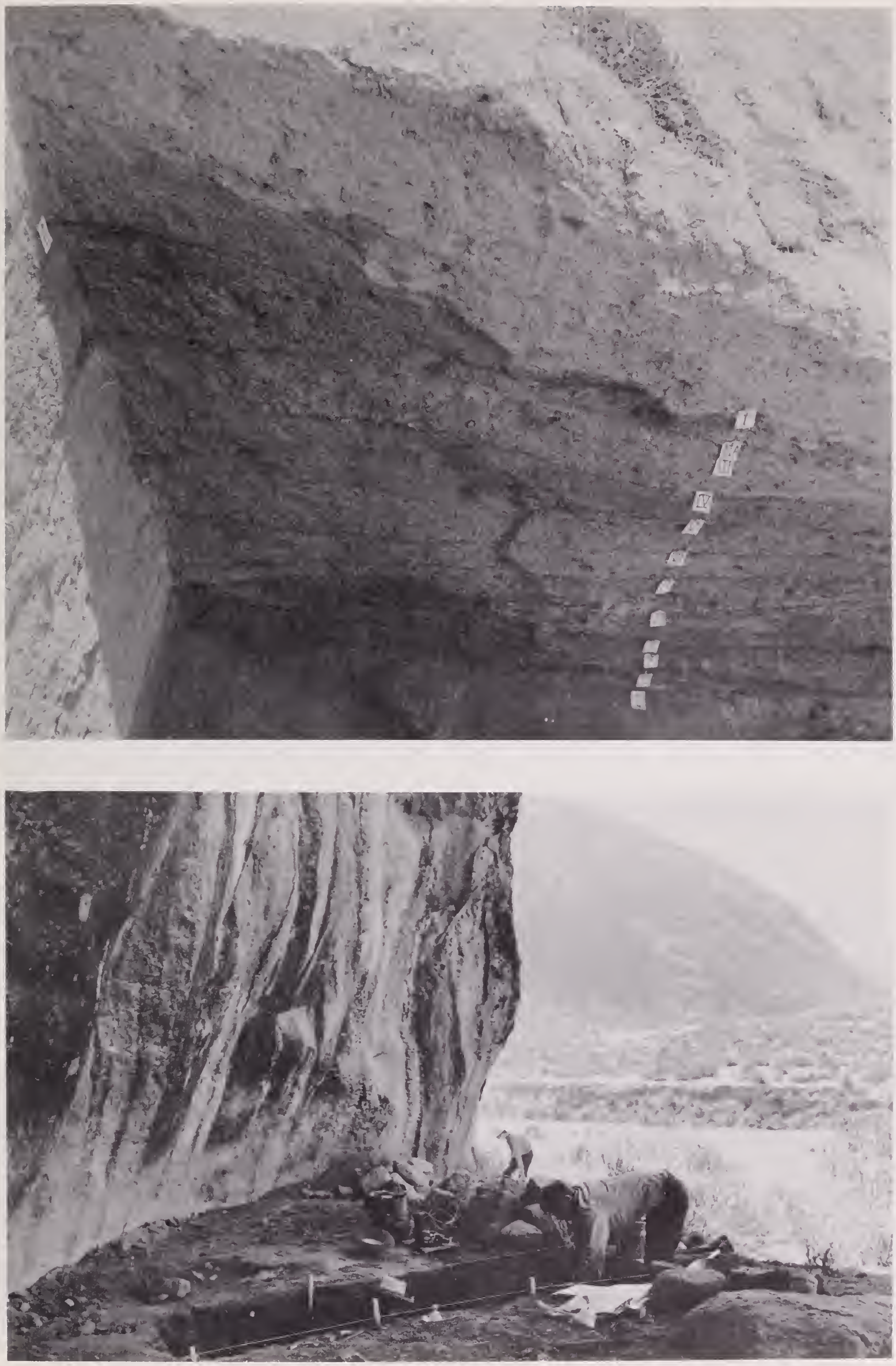


Fig. 8. (Upper photo) west wall of trench of As 158 showing stratified zones; (lower photo) excavation in Jaywamachay, Ac 335.

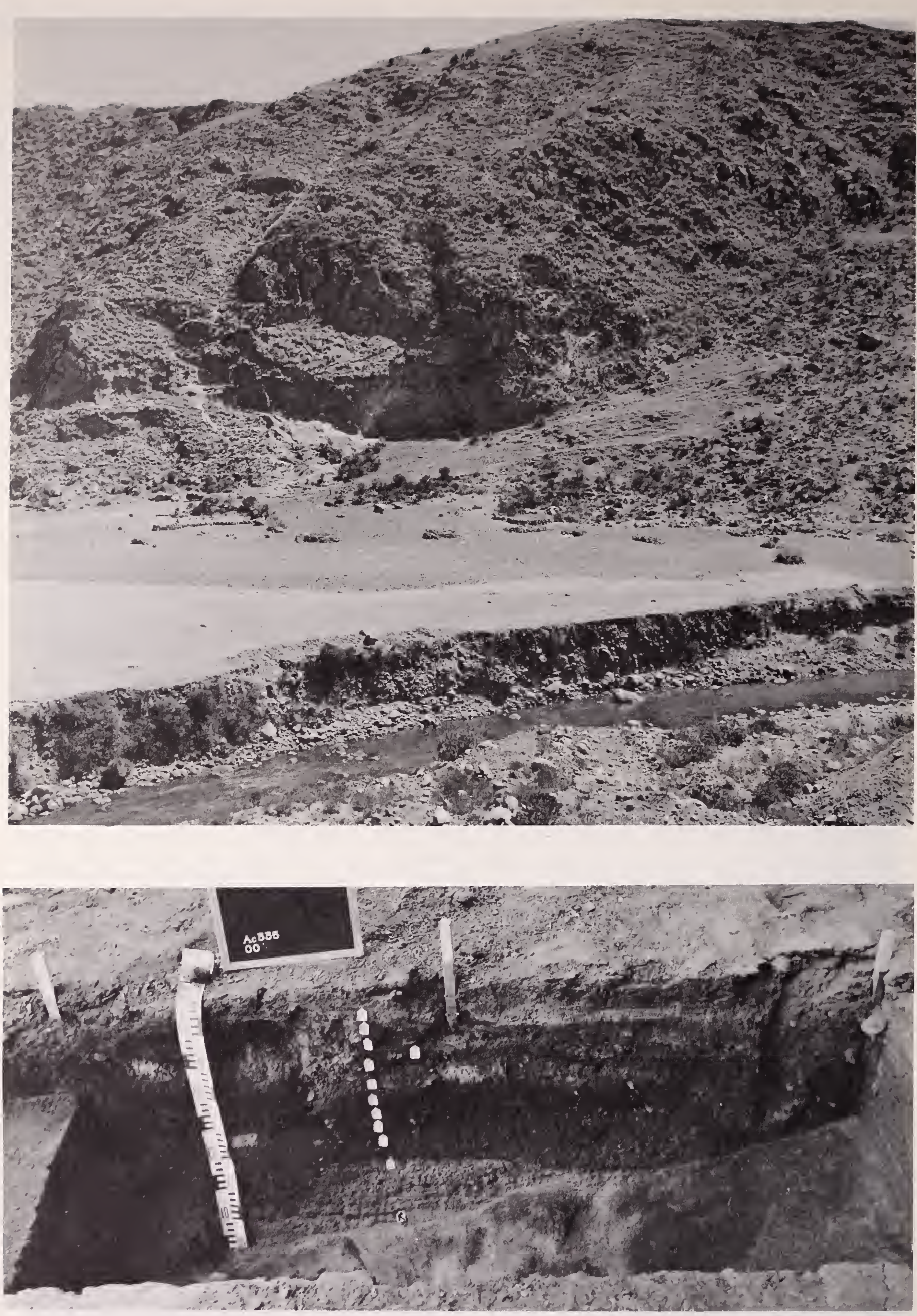


Fig. 9. (Upper photo) looking northward at Jaywamachay; (lower photo) west wall of trench in Ac 335 showing stratified zones.

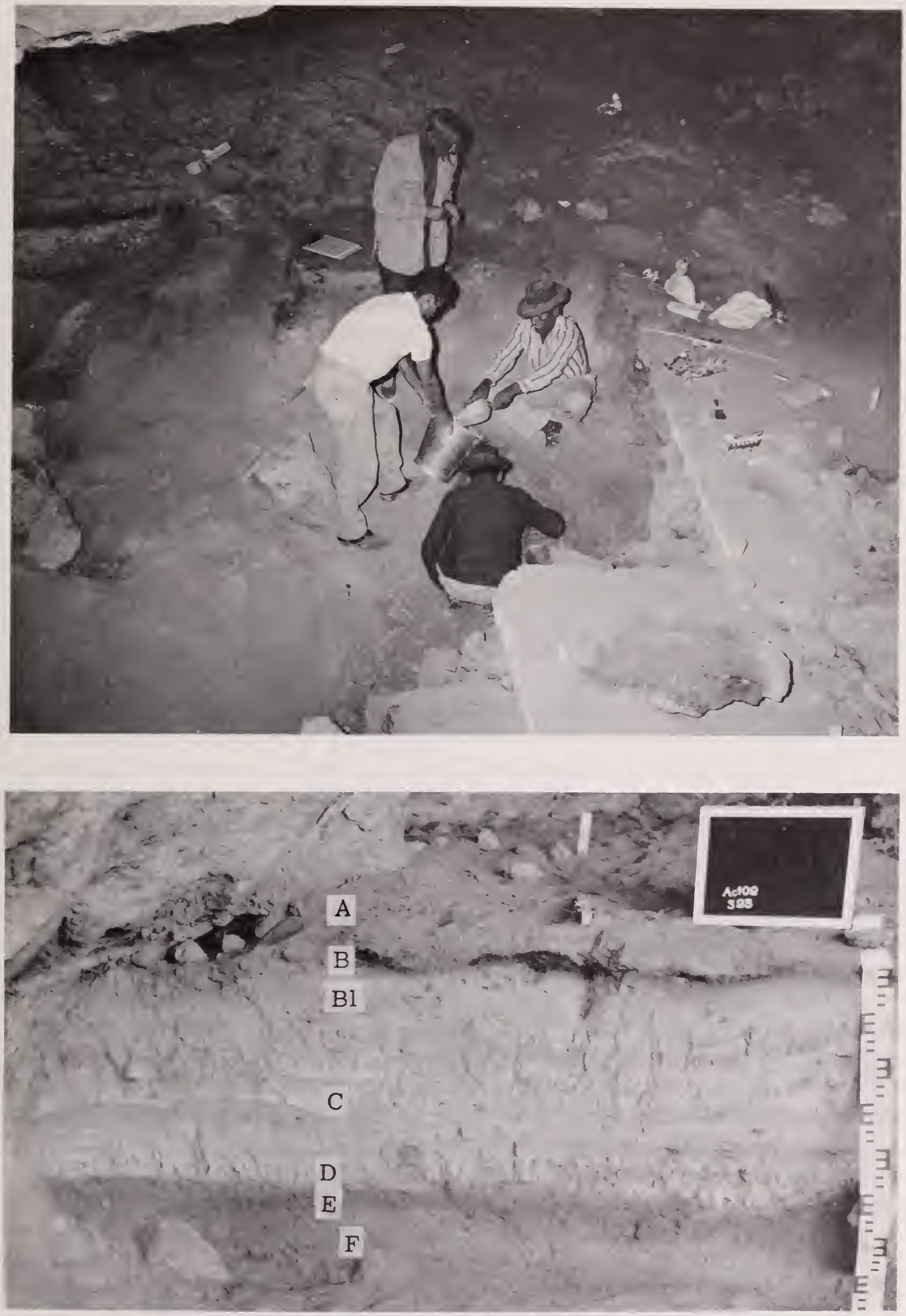


Fig. 10. (Upper photo) excavations in inner room of Pikimachay, Ac 100; (lower photo) stratified zones in Ayamachay, Ac 102.

Pikimachay about a half a mile to the south. It was excavated under the direction of Dennis Price who was assisted by Carlos Chahud and Hernando Carillo, as well as six workmen from Pacaicasa. The cave has a roughly triangular floor and is about 8 meters wide at the mouth. It has a maximum interior depth of about 6 meters and is about a meter and a half high at its maximum height. Here Dennis Price directed an excavation into its 70 centimeters of refuse. The refuse was not very complex: Zone A, goat dung; Zone B, a burned floor with Middle Horizon ceramics and plant remains; Zone Bl seemed also to be of the same Middle Horizon and includes various kinds of Polychrome pottery; Zone C is a 40-centimeter layer of silt deposits; Zone D, a thin gray ash layer with Wichqana and Huarpa sherds and a number of projectile points and bones. None of the upper zones had the kind of preserved plant remains we had hoped to find, although we did find a couple of pieces of squash. Below Zone D in a series of pits and depressions there seemed to be another preceramic complex, either Chihua or Piki, which are called Zone E-Zone F, and below these pits or intrusions is a thick hard layer of Jaywa material with a rind of Crescentia cujete. Thus again, this cave confirms the stratigraphy which we had found elsewhere. However, the cave is of some interest for the early materials contain other kinds of faunal material, mainly small animal bones, and there were different proportions of artifacts (i.e. a large number of scrapers). This would seem to imply that there was a slightly different subsistence, possibly a different seasonal occupation, and also a different type of adaptation to a different kind of ecological zone. The analysis of faunal materials of this cave compared with other assemblages of the same type in different ecological zones may prove very interesting in terms of understanding the scheduling factor and the seasonality and the type of life in each season and zone of these early people.

The final cave tested was Rosamachay, Ac 117, along the banks of the Chihua River. This is a small cave about 6 meters wide and about 4 meters deep and about a meter and a half in maximum height. It was initially tested by Wiersum, Chahud, and Cook, and before the 1969 season is out Price will be able to excavate further in it. There is only about 60 centimeters of refuse in it, in four well-defined zones. Zone A, a brown ash, contains Early Horizon or Early Intermediate Period ceramics. Zone B seems to contain Cachi complex materials as does Zone C, and Zone D may be of the Chihua complex. Thus excavation of this cave which does have some plant remains in most of these zones could do much towards confirming the stratigraphy of Pikimachay, again showing definitely that the Cachi complex is later than the Chihua complex.

We did some testing in many other caves and so know a little of the stratigraphy of these caves; also the surface collections gave us a little information about classification of the complexes in other caves. One area where there is a series of quite good caves is the Tambillo area. We planned to test them this year, but our testing backfired on us in Ac 240. There was about a meter of refuse with seemingly Early ceramic remains over Cachi remains which had some small cobs of Confite type corn in it. After one day of testing it on Friday, our crew left, hoping to return on Monday. When they returned on Monday, some local person who was looking for gold had taken a pick and completely churned up the material. All evidence of stratigraphy was completely gone. Thus, we didn't attempt to test this season sites Ac 244, Ac 245, Ac 247, and Ac 250 in the same area. When we dig them we will dig them completely and sleep in the caves if necessary. One other cave that we did test was way up in the tundra zone at a place called Totomachay. This is site Ac 351, a very large deep cave in a very cold climate with a spring coming in through the back of it. We dug three or four holes in this cave hoping to get some stratigraphy, but with little result because of the large amounts of water flowing through the refuse. However, future excavations could drain the spring; there seems to be a good possibility of finding Middle Horizon ceramics at the top, Early Horizon or Early Intermediate Period below them, and then some sort of Cachi remains above Piki and/or Jaywa remains. It could give us a cultural sequence in the tundra zone at 4,200 meters above sea level.

SUMMARY

We have been fortunate that our lab was extremely efficient and we were able to analyze much of the ceramic and preceramic remains that came out of the test excavations as well as materials from the survey. In the following figure the sequence of complexes and their diagnostic artifact type are shown. It is an extremely tentative sequence and also we have done some analysis of it but we very definitely need much larger samples from layers at every site. We do, however, seem to have a long archaeological sequence which I will now briefly describe.

The earliest remains are called the Ayacucho complex and artifacts of this complex appeared in Zone H, 34 artifacts, Zone H1, 17 artifacts, and Zone H2, one piece of polished bone in the south room of Ac 100, Pikimachay Cave. These materials were about a meter and a half below the surface, literally on the floor of the cave itself, and were separated from later materials by literally tons of rock fall. The artifacts may be divided into five general groups. The largest group, or what we may call uni-

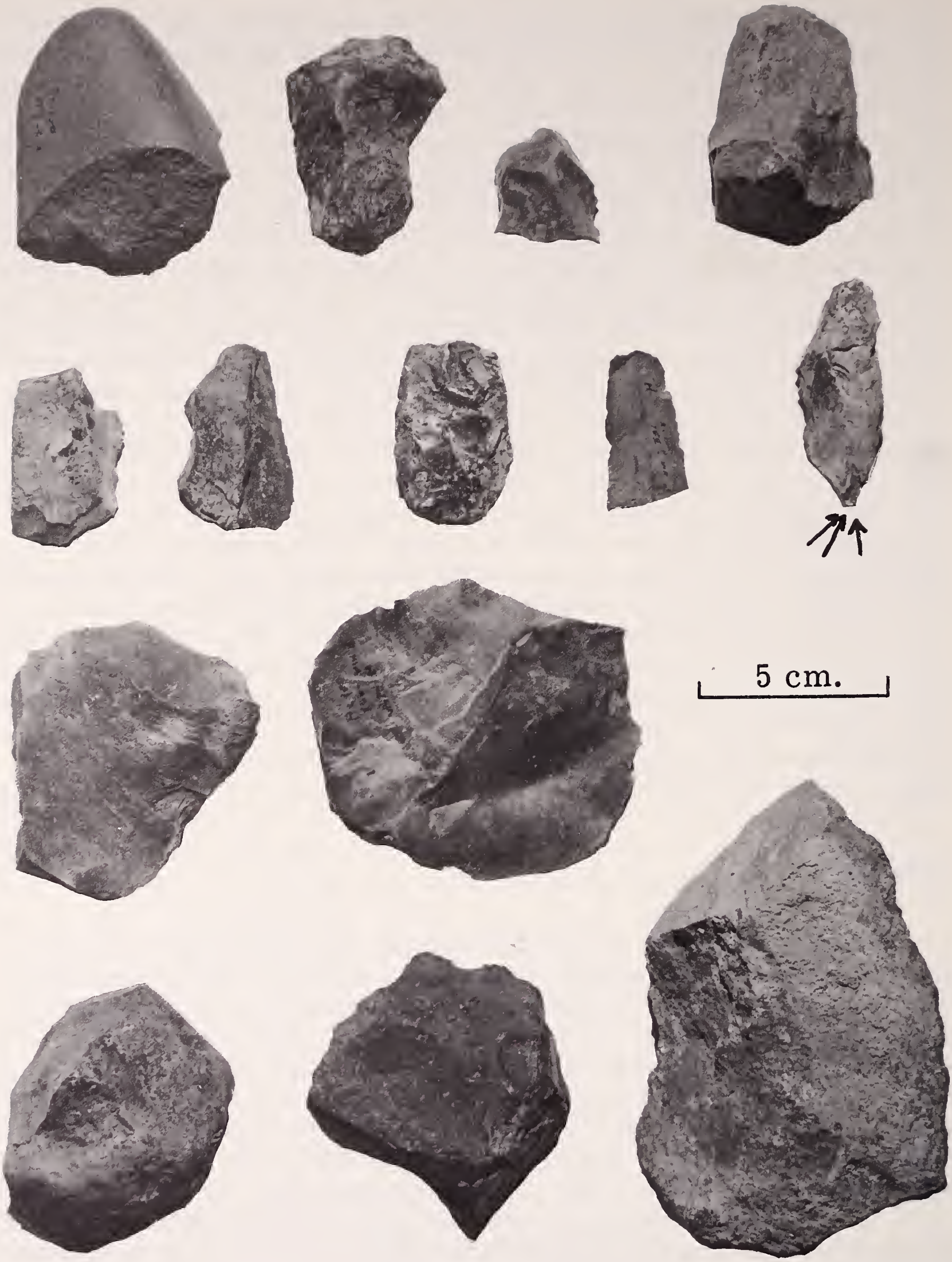


Fig. 11 Artifacts of the Ayacucho complex

facial tools, consisted of eleven thick sidescrapers, five split pebble double-edge sidescrapers, four large thick slab sidescrapers, two slab spokeshaves, one thin flake sidescraper, and one back blunted spokeshave or sidescraper and one battered flake which had been utilized as a scraper and/or knife. Not quite so numerous were a second group: two pieces of split pebbles that had been made into some sort of thin denticulate artifact, a peaked flake denticulate and two cortex of flakes that were unifacial had been chipped to a rather dull point. The third category is pebble tools. The most numerous of these were seven nucleus core choppers. Also common were four pebble choppers, three pebble spokeshaves or denticulates, two pebble gouges, one pebble chopper core, and a pebble concave chopper or bifacial spokeshave. The other artifacts that we uncovered must be considered entirely separate. One is a long tubular piece of flint that had three burin blows on one end of it. The other one which might pass as a bifacial tool is a small wedgelike object with a battered striking platform on one end and bifacial chipping on the other to form a gouge or a wedge. Down the sides from the striking platform at the base are a series of long parallel flakes or flutings. Stratigraphically the position of this complex is well established. Its artifacts bear little resemblance to the following Puente complex so one must guess that this complex occurred considerably before that of Puente. Confirming this hypothesis is the fact that in the Ayacucho complex there is a whole series of bones of extinct animals that do not occur with Puente. A jaw was classified as a paleollama and there are, even to my non-professional eye, bones of a number of other extinct species. One other bone was classified by Hoffstetter as a humerus of a Megatheriidae, but without more of the skeleton he did not care to say exactly what species it was. This humerus has been radiocarbon dated by Berger and Libby as 12,200 B.C. ± 180 (UCLA 1464). Thus one might tentatively assign the Ayacucho complex to the 13,000 to 12,000 B.C. period.

Relationships to excavated archaeological materials from South America are hard to find. The hypothetical pre-projectile point sites that Krieger mentioned are vaguely similar, but whether they are as old, or for that matter actually exist as complexes remains to be seen (Krieger 1964). The same may be said of Willey's early chopping-chopper tool tradition. At present the Ayacucho materials do not resemble other artifact complexes in Peru, even those from the Chivateros and Oquendo sites. Thus, for the moment, our Ayacucho complexes have no counterparts from other regions in South America. The three one-meter squares where we first encountered Zones H, H1, and H2 with artifacts of this complex would seem to be just on the edge of the main concentration and much more could be found by opening up a larger area. This we hope to do in the next seasons. Obviously the sample of artifacts is extremely slim, and only with a larger sample will we be able to determine if this in fact is pre-projectile point or early pebble tool complex or something else. Though we have quite a number of bones, we obviously need more in order to establish the identifications more firmly. As Hoffstetter suggested, it may very well be that we have a completely new species of the genus Megatheriidae, so further digging may make a contribution not only to archaeology but also to paleontology. We also hope we will be able to get some charcoal for radiocarbon determination to supplement those done on the bones.

Following the Ayacucho complex is the one we call Puente. Components of this complex occurred in Zone 13 in various occupations of the Puente site, As 158, as well as in the six lowest zones, F through K, in Jaywamachay Cave, Ac 335, and the open site, As 172. Unfortunately, none of these components had large samples of artifacts, only eighty-nine being found, all told. Thus, for the present, the complex is poorly defined. Distinctive projectile points for the complex are Puente Incipient stemmed, Lauricocha stemmed, and Tuina triangular. Also occurring here and lasting into later horizons are Puente pointed, Ayamachay stemmed, Ayampitin leaf-shaped, and Payenca rhomboid. Perhaps more distinctive than the projectile points are the endscrapers which include keeled, flat, concave-ended, or gouges, and large ovoid plano-convex types. There were also a few small rectangular ones and flake ones that carried on into the later horizons. Other artifacts that are particularly prevalent are flake choppers and cobble sidescrapers and unifacial drills. We also found a flake burin. These, as well as the general sidescrapers, carry on into later complexes. The scraper types and Lauricocha stemmed points relate these materials very definitely to the earliest horizon of Lauricocha which dates about 7500 B.C. The Puente Incipient stemmed and the Ayamachay stemmed points, the scraper types, the flake choppers, the unifacial drills, all also seem to show that this early Puente complex has some connection with Toquepala I, also dating at about 7500 B.C. The whole complex of projectile points and endscrapers, however, is much more similar to that of the abundantly documented lowest levels of Tres Ventana Cave dug by Engel on the central coast. These horizons bear dates of about 8000 to 6500 B.C. The Payenca rhomboid, Lauricocha stemmed, and Puente Incipient stemmed points, as well as some of the scrapers, particularly the cobble sidescrapers and teardrop and gougelike endscrapers, make it somewhat similar to the Arenel complex in the Ancon area north of Lima which is also estimated as existing about 7000 B.C. Thus, on the basis of these relationships and the dates of these related complexes, we guess that this complex falls somewhere in the period between

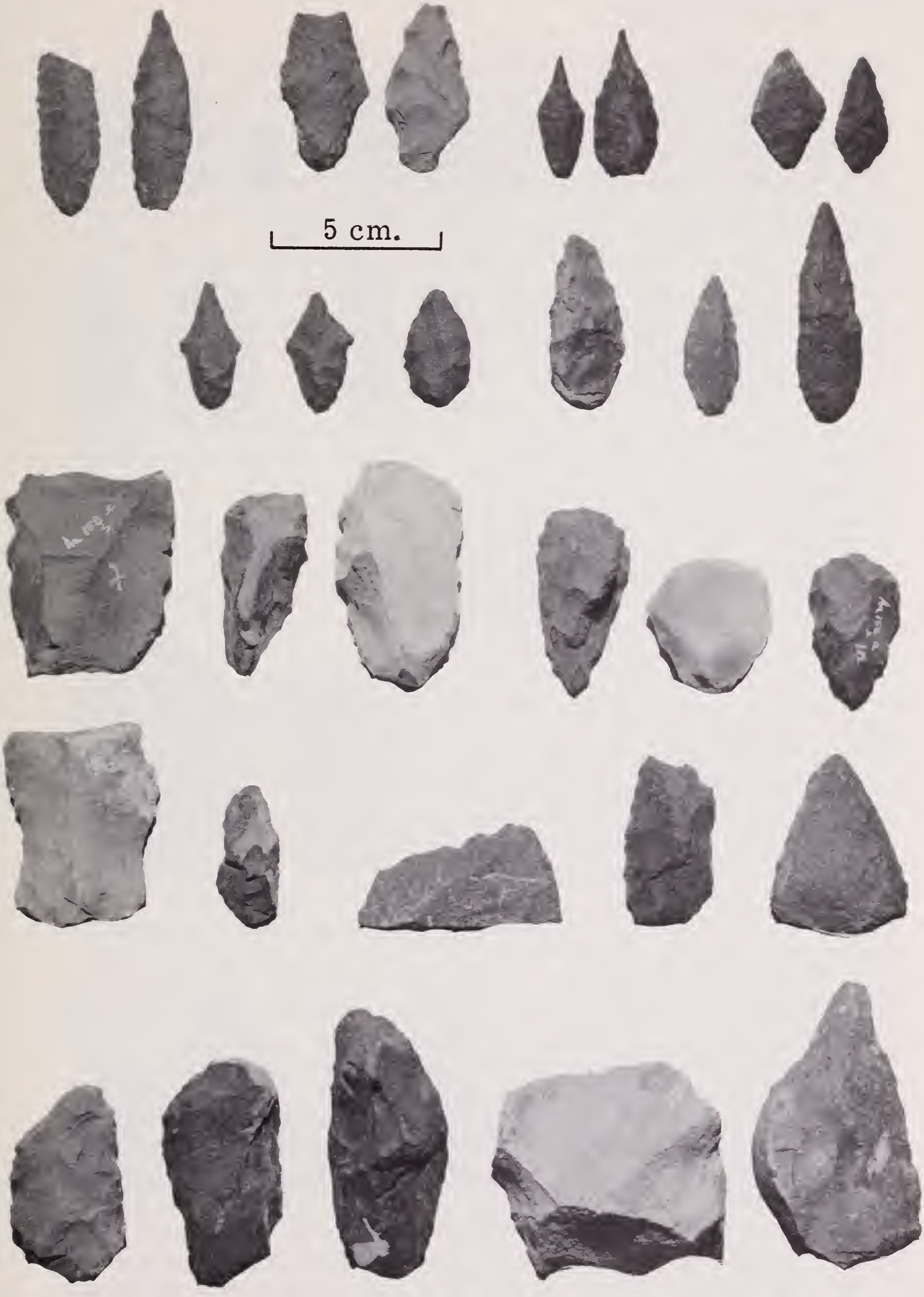


Fig. 12 Artifacts of the Puente complex.

8000 and 6400 B.C. One carbon sample from Zone G of Ac 335 dated at 6410 B.C. ± 125 (I4501) seems to indicate about when the complex ended. Obviously we need many more artifacts from all the components we found, but the components do exist and appear to be extensive. If we can dig them, they should yield the necessary large sample. Even with this limited sample of artifacts we found many bones, seemingly of deer and antelope, and possibly llama. There is basis for a fine zoological study and the bones we will get in future excavations will make an even better study. For the present, we would guess that these people were basically hunters, but only further excavation and zoological studies will confirm or deny this.

In Jaywamachay Cave, Ac 335, above the Puente remains, as well as Zones 10 to 12 of As 158 above the Puente floor, are components of the Jaywa complex. Another excavated component is Zone F at the bottom of the excavated Ayamachay Cave, Ac 102. Surface collections from sites of this complex occur at As 123, Ac 300, Ac 101, and As 162. Our sample of artifacts for defining this complex is much more adequate, since about six hundred were uncovered. Carrying through from Puente are Puente pointed, Payenca rhomboid, Ayamachay stemmed, and Ayampitin leaf-shaped projectile points. There are, however, a number of new types, such as Puente unifacial, San Nicolas leaf-shaped, Jaywa round-based, Jaywa stemmed, and, near the end of the phase, Canario leaf-shaped and Piki straight-based. Endscrapers were relatively different from the earlier Puente and include small ovoid plano-convex endscrapers, flat teardrop endscrapers, small neatly chipped disk scrapers, end-of-blade scrapers, rectangular endscrapers, and a few keeled ovoid scraper planes. Other distinctive traits were various kinds of half-moon side blades. Other artifacts are pointed and ovoid sidescrapers, denticulates, spokeshaves, a bone knife or scraper, and flake burins. The Canario points and Payenca rhomboid points indicate relationships with Canario and Lauricocha III. These point types plus Jaywa stemmed, and some of the scraper types indicate connections with late Tres Ventana Cave and the middle levels of Toquepala Cave. Carbon 14 dates for these various horizons related to Jaywa fall somewhere in the period from 6400 to 5000 B.C. and our dated sample from Zone D of Ac 335 at 6300 B.C. ± 135 (I4503) confirms this.

One of the most interesting aspects of this cultural complex is the fact that we have components of it in the Tundra, the Humid Scrub Forest, the Dry Thorn Forest, the Dry Thorn Forest-Grassland, and the subtropical Desert zones. The evidence of the subsistence complexes and even the proportions of artifact types are rather different from sites of each zone. Certainly more work needs to be done and more study of these differences

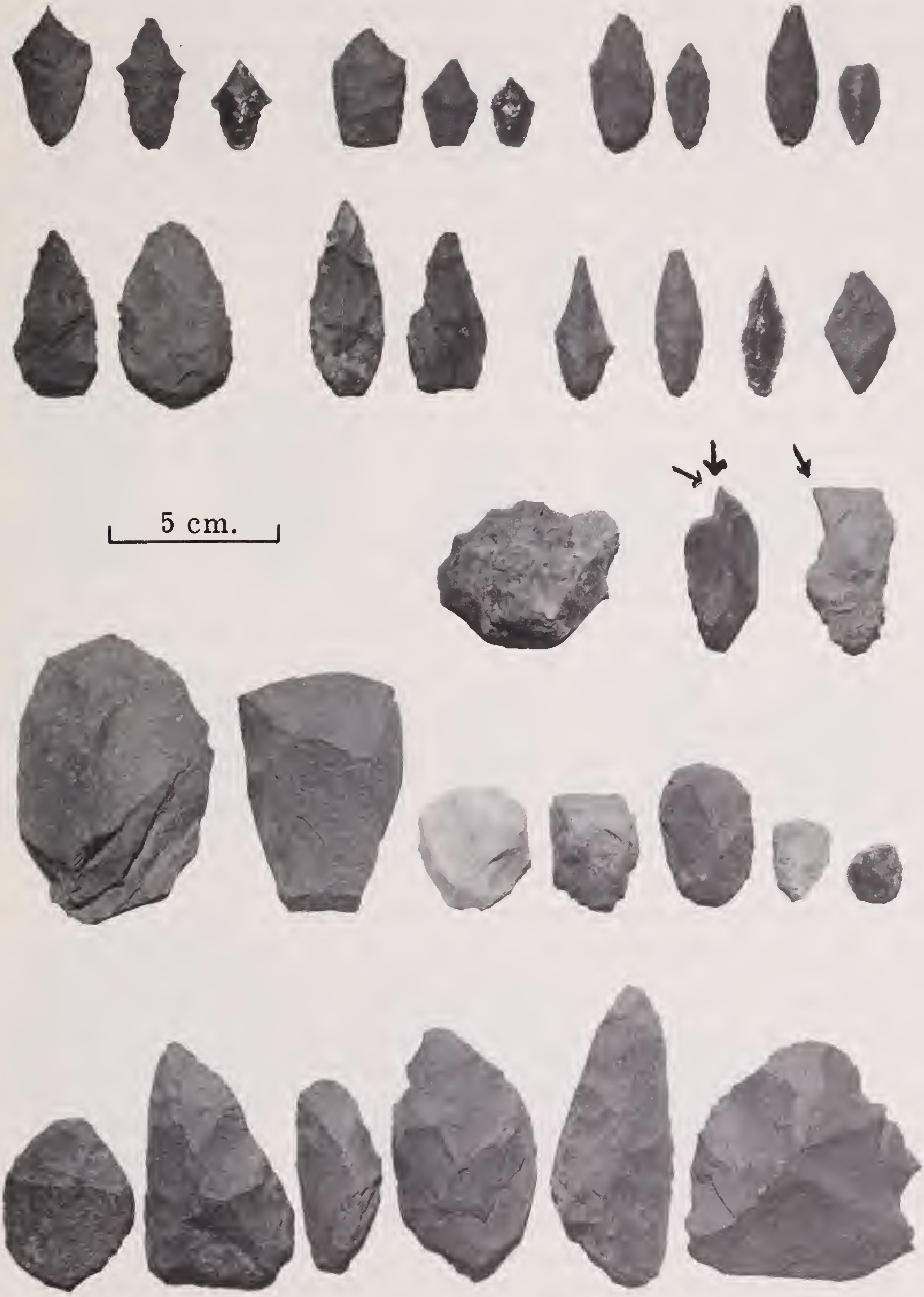


Fig. 13 Artifacts of the Jaywa complex.

is necessary in order to understand better their seasonal and annual migrations. Again, there were large numbers of bones in some of our excavated components and some of these certainly are llama. In Zone B2, one of the later components in Jaywamachay Cave, was burned llama dung in the same floor with human artifacts, suggesting that perhaps even at this time llama was living with or was domesticated by people of this complex. There were also found a few seeds of Achiote and rind of Crescentia cujete tropical plants, which suggests very early trade or possibly very early domesticated seed crops in the highlands. There are feces from these horizons that also should be studied. Again, more work is needed, particularly excavations in the different ecological zones, to fill out our knowledge of this cultural complex. The results of these excavations and further study I believe should yield significant results concerning the early domestication of both plants and animals in the highlands.

Components of the following Piki complex were found above Jaywa remains at As 158, Zones 2 through 9. They also occurred in the lowest levels of As 351, Zone D, and they occurred in the central room of Pikimachay Cave, Zones X, V, K, U, and W. While we have fourteen components, all from excavations, none of these floors yielded large samples of artifacts, so the complex is poorly defined. Ayampitin leaf-shaped, Jaywa stemmed, and San Nicolas leaf-shaped, all of which occurred in the Jaywa component, last into this period. The Canario points and the Piki straight-based that started in the previous period now become the most prominent types. Two brand new types, one called Chira stemmed and one called Catarino stemmed, occur. Again, many of the endscraper types last on and there are many small ovoid plano-convex endscrapers and teardrop endscrapers. There are, however, for the first time, and only in this period, concave-sided endscrapers, and now narrow-nose endscrapers become particularly prominent. This is also the beginning of our scraper planes complex, and we now see, besides the keeled and peaked ones, pebble scraping planes and flat-topped scraping planes. We also see the beginning of the diagonal-nosed endscraper that carries on into the later periods. Side knives continue. There is one particularly distinctive type for this period that has a steeply-flaked backing to the concave knife edge. We also continue to have denticulates, and there are a number of stones in this horizon that may be pebble hammerstones or pestles. Perhaps the most important aspect that has come out of this poorly defined complex which needs much more investigation is the definite evidence we found of llama domestication as well as guinea pig domestication. Further, there are shells of what appear to be gourds, and shells of some sort of cucurbit. Besides these there are quinoa and amaranth seeds, and in one feces which has yet to be totally

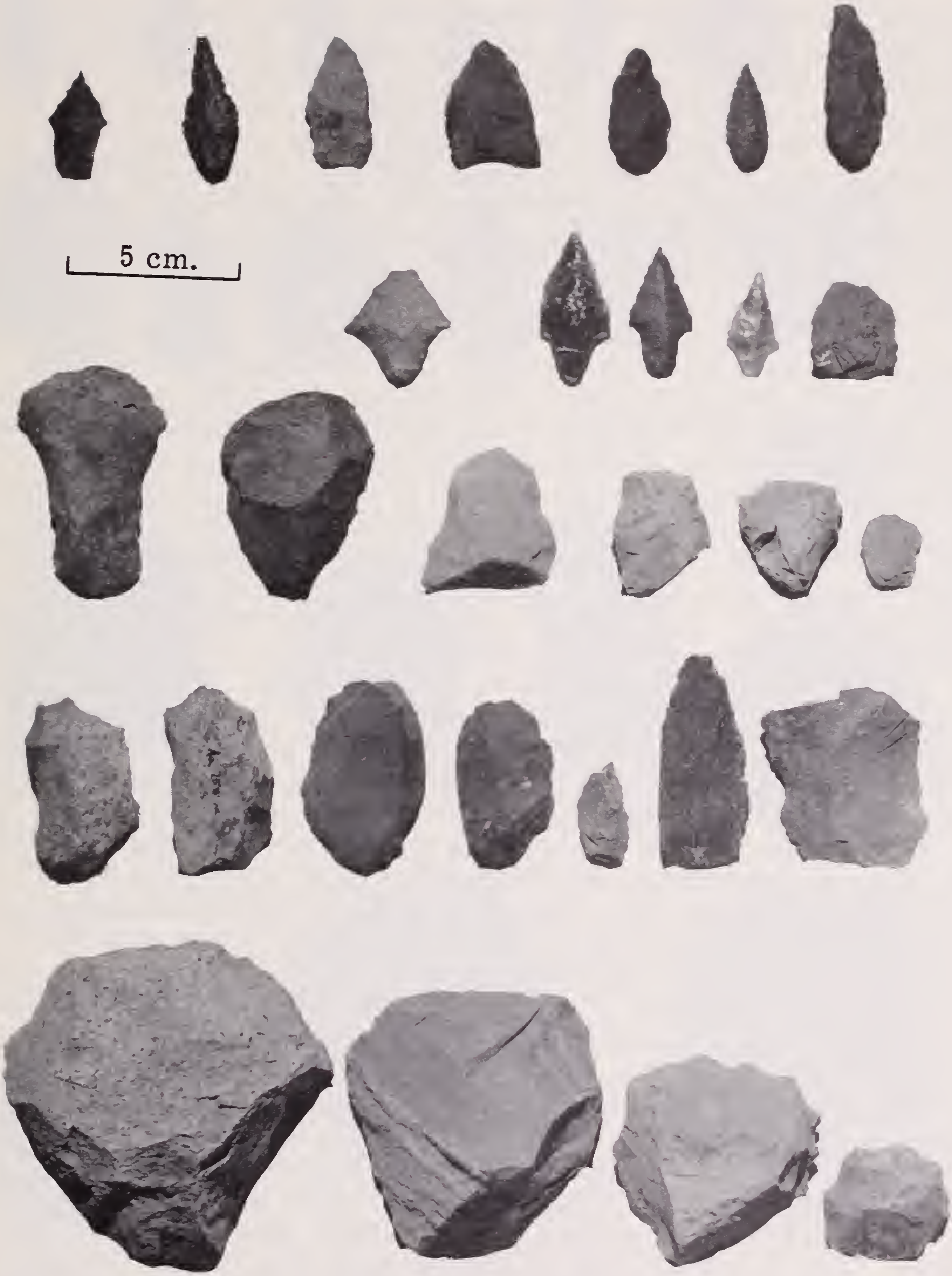


Fig. 14 Artifacts of the Piki complex.

analyzed there is possibly a pepper seed. Thus, it is in this horizon that we see our first definite evidence of domestication of plants. It might be added that the present findings are in direct contradiction to many theories that would have us believe that the first crops domesticated in the highlands were root crops, and that later seed crops came in from Mexico to supplement the root crop diet. Certainly our finds so far from this horizon are categorically opposed to these ideas. However, when more of the feces are analyzed, it is possible that we will find evidence of other domesticated plants.

Dates are extremely difficult to get for this horizon, and perhaps the best evidence for dates are the presence of Canario points and a number of other artifacts that look quite a lot like the Canario complex defined on the central coast. On the basis of these resemblances, I would guess that these horizon dates run somewhere between 5000 and 3800 B.C., but this has been confirmed by a carbon determination from Zone 2 of As 158 of 4410 B.C. ± 110 (I4502). This is a key period in the whole history of plant domestication and the resulting cultural developments in the Ayacucho Valley. If I were to pick one period most important for further investigation, I would pick this period.

Our next artifact complex is called Chihua. In Pikimachay Cave, Ac 100, there were four components in the north interior rooms. Zone 7-G1 and Zone 8-G2 appear to be in strata above that of the Piki complex of the same cave. Also in Zone E of Ayamachay Cave, Ac 102, there were Chihua remains above Jaywa remains in Zone F. Zone D of Rosamachay Cave, Ac 117, also has a component of this complex. There also were about ten open sites which were seriated and classified as belonging to this complex. One of these is extremely large; these are the remains of either an extremely large macroband camp or an actual village. We again have a very large and adequate sample of this complex. In terms of projectile points, the Piki straight-based, the Ayampitin leaf point, the San Nicolas leaf point, and the Canario leaf point continue, although all of them are beginning to die out. Two new point types appear. One of these is a small unifacial lenticular type called Pikimachay plain, and the other is an extremely crude leaf-shaped point called Cachi plain which looks to be extremely similar to the Encanto points found on the coast. The one thing most noticeable about this artifact complex, however, is that scraper planes are increasing in abundance, the chipping is much cruder, and the artifacts extremely large. Gouge scraping planes, disk scraping planes, square-ended scraping planes, flat-topped scraping planes, plano-convex scraping planes, small ovoid scraping planes, all occur for the first time along with pebble scraper planes and keel scraper planes which had occurred earlier. Endscrapers are now in the minority but

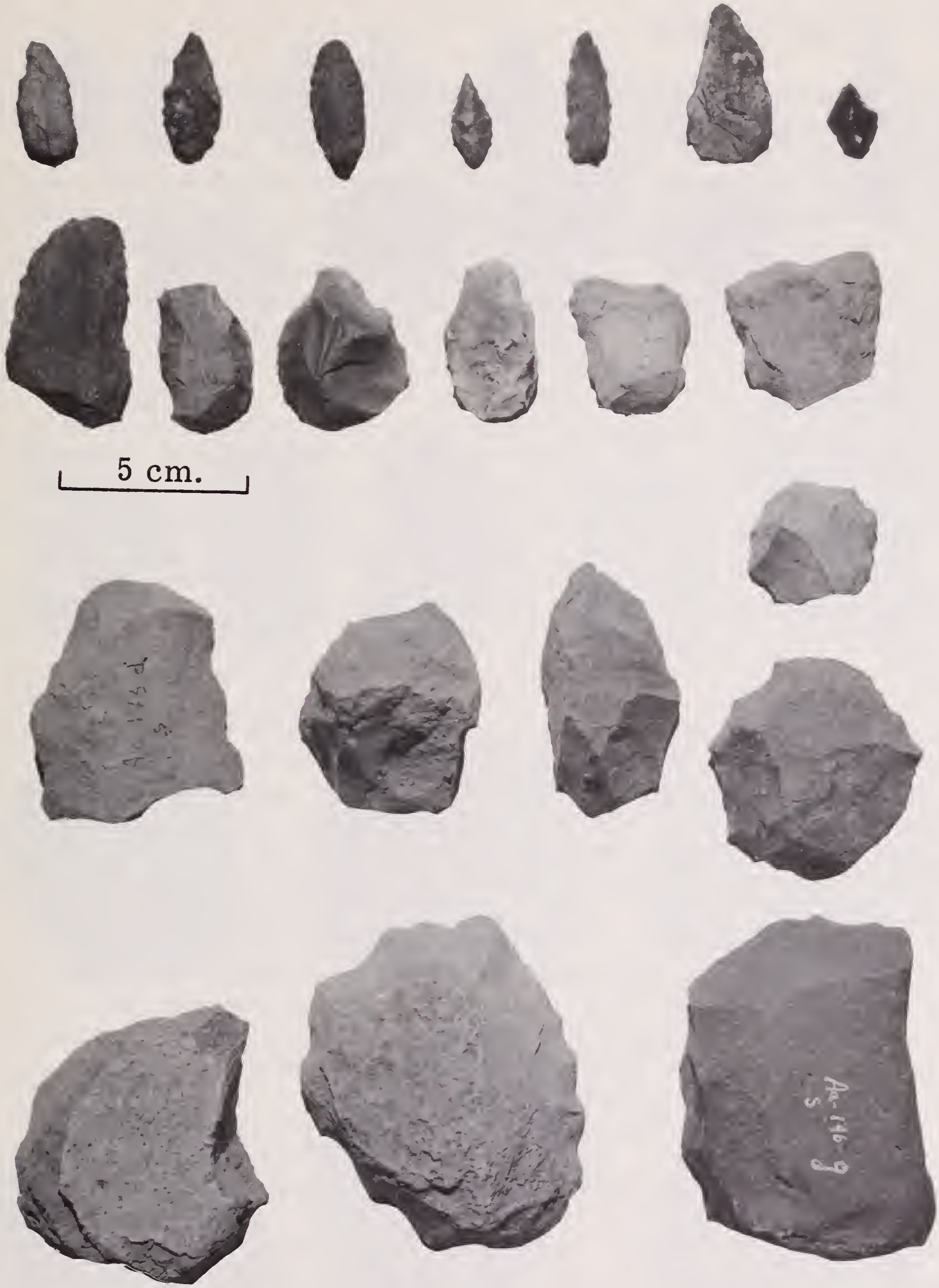


Fig. 15 Artifacts of the Chihua complex.

ovoid plano-convex endscrapers, teardrop endscrapers, narrow-nosed endscrapers, and diagonal-nosed endscrapers continue to occur. Perhaps the only new scraper types are the few large flat-topped rectangular endscrapers. Denticulates also occur, as do spokeshaves and steep-backed side knives. Another item which is noticeable is a series of large crude choppers or cores which we now begin to have. Some of these are bifacial, some are unifacial, and some are pointed, and they come in a variety of shapes and sizes. There are also a few pieces of ground stone, either metates or milling stones or manos, for the first time. For foodstuffs, there are many llama and guinea pig bones and squashes, quinoa, amaranth, and gourds which continue from the previous horizons. Now besides these there are lucuma fruits, some Sapindas fruits, cotton, and possibly some root crops; and in two very disturbed areas there were a single common bean and a couple of cobs of corn. I have considerable doubt about the provenience of both these latter two plants, and we must await better contextual excavated evidence before we can accept these as domesticated plants belonging to this horizon. However, these people are using larger amounts of domesticated plants and animals. Almost all our caves will produce more of these horizons upon excavation, and certainly an open site should be dug. In respect to our ten surface sites, we have sites from each ecological zone, and our superficial comparison of materials from these sites seems to indicate that the artifacts and probably the subsistence was rather different in each of the zones. This may be the result of some sort of seasonal round of agriculture and collecting and herding. Again let me say that although we have an adequate sample now, much more should be done. In the dating situation, the resemblance of the Cachi points to Encanto points, as well as some of the scraper planes, suggests that Encanto from the coast and Chihua are roughly contemporaneous, and I would therefore guess that this horizon exists somewhere between 3800 and 2700 B.C.

In our next artifact complex, called Cachi, six components from Pikimachay Cave, Ac 100, and Zones B and C from Rosamachay Cave, Ac 117, are all above Chihua remains. Also, eighteen components from the surface exist for this complex, and many of these are large. Also, As 109 has architectural features on it that may or may not be preceramic and belong to this complex. From our excavations as well as from our surface collections we, at present, have a large number of artifacts. Like the previous horizon, Cachi is characterized by a large number of crude scraper planes and choppers. San Nicolas and Cachi points carry on from the previous horizon, but there are two new types of triangular points, one called Quispe triangular, a rather large triangular type with a fluted base, and a small triangular type

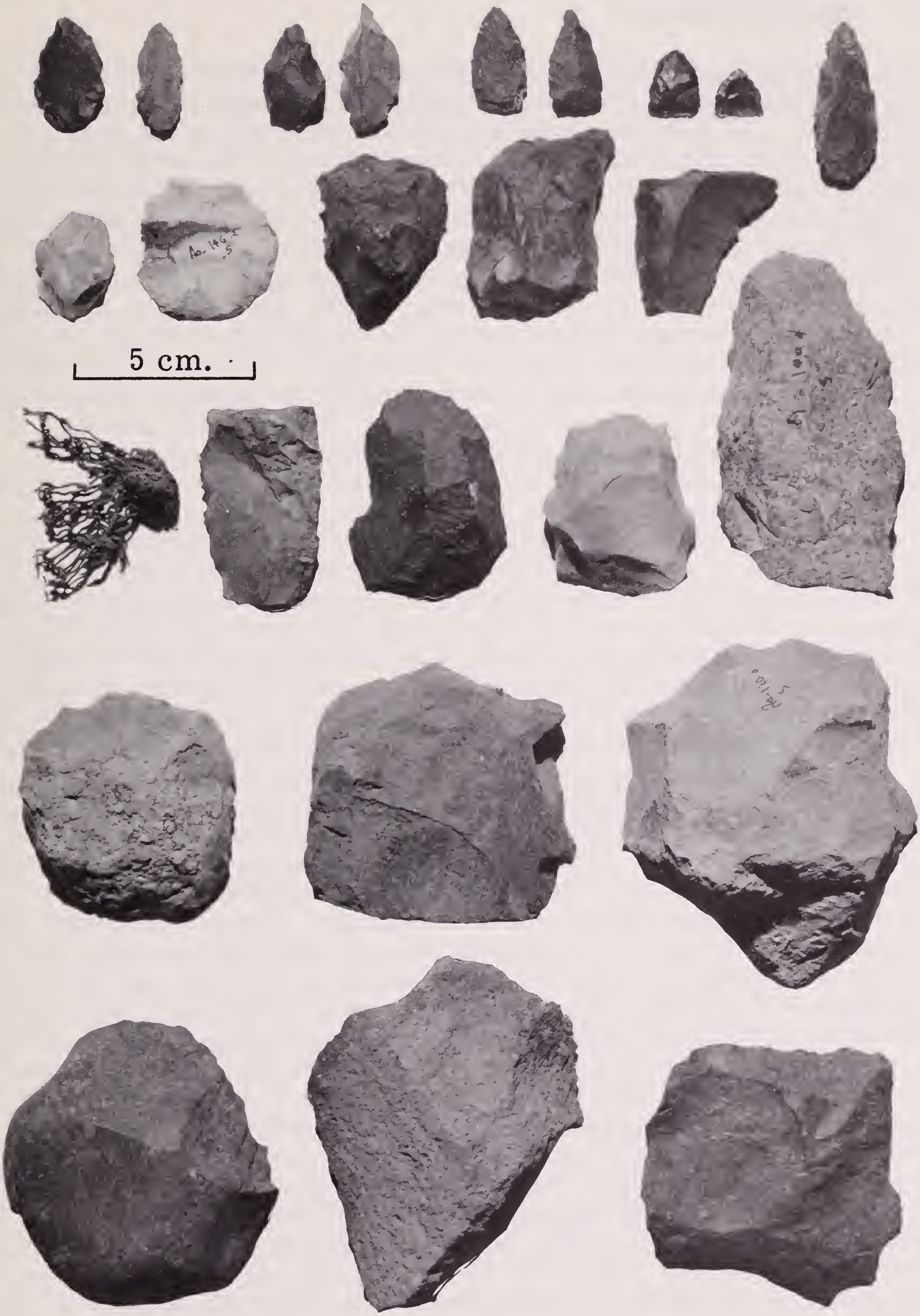


Fig. 16 Artifacts of the Cachi complex.

called Pikimachay triangular. Other new artifacts are disk choppers, small plano-convex disk endscrapers, scraper plane gouges, triangular endscrapers, crude rectangular endscrapers or gouges, hoes, manos, and metates, and cotton weaving. We have a radiocarbon date of 1900 B.C. ± 120 (I4154) from one late component of this horizon suggesting that it falls in the general period from 2700 to 1700 B.C. Subsistence seems to have been agriculture and herding with all the previously mentioned domesticated plants and animals, as well as corn, beans, squash (Cucurbita andreana) and Canavalia beans. Other excavations of dry caves would greatly supplement this list of plant remains. Perhaps the most important investigation that could be undertaken would be open sites in different ecological zones. Some of these sites would certainly give us information about a changing social organization and a changing system of settlement pattern that would be most significant in our story of the rise of civilization. Obviously, if we excavate again in the Ayacucho basin we will get a great deal of Cachi vegetal materials. Some of this might have great significance in understanding the origin and spread of domesticated plants, for if corn is earlier here in the highlands than it is on the coast, then the problem of Mexican origin for all corn is wide open again. This is the same for beans and for moschata squash. Obviously a larger sample of these common plant remains, even in this late preceramic horizon, would be very important.

In the foregoing pages I have briefly described what were considered the most important archaeological remains discovered by our expedition. It was also the part on which we did some preliminary analysis. The later horizons have been only briefly dealt with in our lab and the previous work has not been very complete. In fact, for all the later horizons, more stratigraphic digs, more analysis, more classification of materials, and more radiocarbon dates would greatly improve our knowledge. However, I believe that I should say a brief word about these later ceramic horizons, and I shall do it in the terms of general periods and horizons. The Initial Period from 1700 to 900 B.C. is represented by two or three excavated components and at least twenty-three surface sites. The lithic artifact complex appears to be much like that of the late preceramic Cachi complex. There are, however, some differences in that there seems to be a great increase in the number of small triangular points and there are some new point types that include small types with asymetrical stems. Pottery is thick and tempered with mica or pyrite or both. Common vessel forms are large seeded jars or small mouth neckless ollas. Decoration, when it occurs, is by incision, fingernail punctate or jab and drag lines. Some of it resembles the Kotosh-Kotosh style. There seem to be circular houses as well as ceremonial structures and possibly water control features.

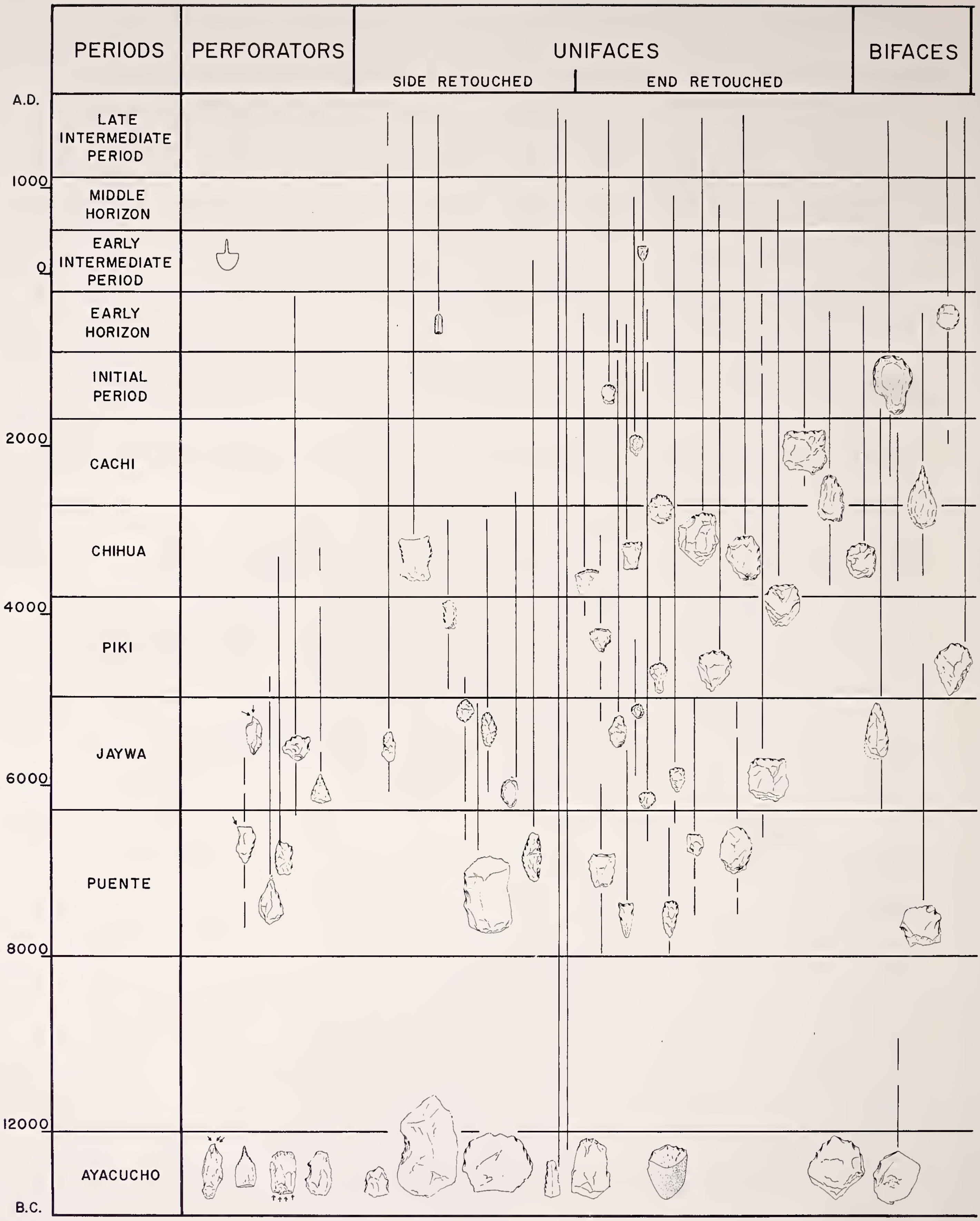
Subsistence is based on full-time agriculture with apparently more plants than the previous horizon. The whole horizon was heretofore unknown and investigation is extremely necessary.

About six or seven excavated components and at least thirty-two surface sites belong to the Wichqana and Rancha ceramic complexes of the Early Horizon. From our brief cursory look, lithic, architectural, and subsistence systems seem like the previous horizon. The pottery is polished with some sort of grooving and is black, brown, and occasionally red, and usually has mica or pyrite temper. A few red-on-brown sherds occur as do Chavin-like sherds. There seems to be a more specialized settlement pattern and system of water control. Both excavation and analysis are badly needed.

There are many sites dating to the Early Intermediate Period and the early part of the Middle Horizon. Archaeological remains consist of at least five or six components from excavated sites and over eighty-nine open sites. Ceramic complexes include Huarpa and Conchapata types. Although many of the older cruder lithic types continue, more fine obsidian tools occur, including small triangular, teardrop, and seriated points. Pottery is quartz tempered and has some bichrome and polychrome painted decoration. Architectural features and settlement patterns show an extremely wide range of types--including some fortifications and extensive irrigation works. Subsistence is based on agriculture and herding, but I get the impression from our meager cave remains that it is more specialized than in the preceding period. Tremendous amounts of information concerning this period could be obtained with little archaeological effort.

The Middle Horizon from 500 to 1000 A.D. is the cultural climax of our valley. About five or six components and twenty surface sites are known for this time period. However, two or three of these sites are cities and one of them, Huari, was apparently the capital of an empire. The architecture and pottery, mainly polychrome, has been previously studied but more work should be undertaken. The great mass of lithic materials are still unstudied and a major effort is needed in this direction. Water control techniques and subsistence appear to be highly specialized. Here is a real opportunity for those archaeologists having an interest in the investigation of urban archaeology.

Late Intermediate Period and Late Horizon sites dating from 1000 to 1534 A.D. are represented by eight or nine components from excavations and about ten sites from the surface. Only three of these are Inca sites dating to the Late Horizon. The lithic material seems to be highly specialized and the large crude stone tools seem to have finally disappeared. Again, these lithic tools are badly in need of study and we do have some from excavation that are worth the effort. Chanka pottery is mica tempered


PERIODS
PERFORATORS
UNIFACES
SIDE RETOUCHED
END RETOUCHED
BIFACES
A.D.
LATE INTERMEDIATE PERIOD
1000
MIDDLE HORIZON
EARLY INTERMEDIATE PERIOD
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EARLY HORIZON
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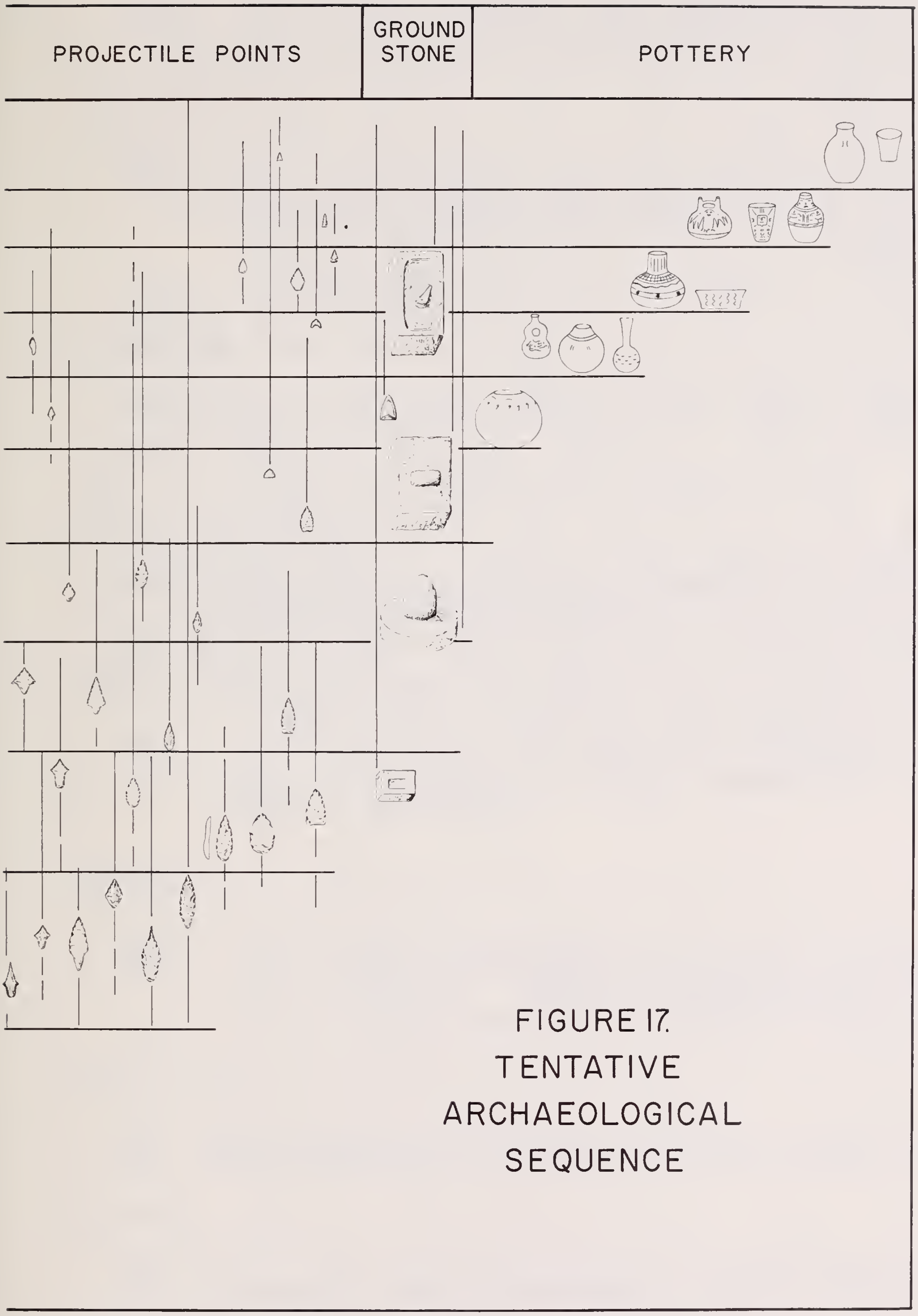

FIGURE 17.
TENTATIVE
ARCHAEOLOGICAL
SEQUENCE

and crude and brushed; most of it has never been investigated nor has any typology nor analysis been attempted. Here again is a major study. The subsistence has definitely shifted from that of earlier periods and there seems to be a definite new economic system in the valley. The sites are on the tops of hills and are heavily fortified and huge in size. They definitely need to be mapped and tested. In fact any archaeology in the later periods should be done in conjunction with the ethnohistory. There is a great chance here to connect the ethnographic present with the archaeological past.

In conclusion it appears that our curiosity about the ancient cultural history of the Ayacucho Valley has caused us to exhume and open a veritable archaeological Pandora's box which has let loose on the archaeology of Peru a host of problems to plague the archaeologists. The solution of these problems, however, is still contained in the box, or should I say still lies in the unexcavated squares. Without pushing this metaphor any further, let me say that now at least we can define the basic archaeological problems of the Ayacucho region and we believe we may know how to solve some of them. Basically, the solution of these problems will not be dependent upon archaeology alone but must employ wide interdisciplinary techniques and cooperation. Thus, the new materials and information we have uncovered this season are, in reality, only an indication that the best is yet to come.

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